
**An Investigation of The Photoelectric Effect to the Endothermic Electric Effect during
the Electric Field Charge**

**Endothermic Electric Effect as an energy gain in the system for a Renewable Energy
Generator**

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Submitted to Swansea University in 2021 for fulfilment of the requirements for the Degree of

MSc by Research

Abstract

The Endothermic Electric Effect is a new concept that has evaded detection and interpretation in our electricity physics science history for 150 years. It was James Maxwell who first identified the displacement current, yet this current was never thought of as a useable energy gain. Academia has generally disregarded it has of no real valuable use to energy science except for explaining electromagnetic wave propagation. Although, there have been some inventors and scientists who have been very interested in this 'free energy' idea that Maxwell and Tesla talked about. The Endothermic Electric Effect is a phenomenon measured during an electric field charge where the system fluctuates between an endothermic and exothermic state. The electric field gains quanta due to the ionisation of the atoms that make up the open system. The catalyst is an Electro Magnetic Force (EMF) placed into the system, inducing 'The Photoelectric Effect', demonstrated with an equation written by Albert Einstein. The endothermic reaction state is a self-charging state of an electric field system where the total current equals the conduction current plus the displacement current. The electricity physics within this work show how the *Endothermic Electric Effect* produces more than a 100% efficiency in a system when certain parameters are engaged. This can be exploited for energy generation.

The knowledge of this type of electricity charge will allow us to build machines that will gain energy from their material as-well as thermal environmental energy, this has already been achieved but is little known of. With this type of energy production there will be less need for Nuclear, Oil, Wind, Water or Solar power. As-well as this, endothermic electricity generators will in the future give us the scope to connect to established renewable exothermic energy generators. This type of energy production will benefit mankind's ability to produce cleaner technologies, to generate energy more efficiently and reduce costs of energy production.

Contained in this work you will discover how the Endothermic Electric Effect has been seen in different systems in the public domain, and how the Photoelectric Effect or for ambiguity arguments an EMF, is the catalyst to the Endothermic Electric Effect reaction. Within this body of work, you will be introduced to new concepts, and theory. The main body of understanding of this event, the charge of an electric field, is described by analysing the experimental results of an electric field charge using different lithium batteries over many different experiments, as-well as showing past empirical generator and theory evidence already in the public domain.

Acknowledgments

I would especially like to thank *Eduard Partenie* for his friendship, and support.

Dr Eurfyl Davies and *Dr Clive Morgan* from University of South Wales (USW).

NASA for their science experiment.

JL. Naudin for his follow up work on Newman Generator.

Last but by no means least, *Joseph Westley Newman* for his amazing insight and his everlasting legacy and contribution to innovation and science.

1st Swansea University Supervisory Team:

Dr Zhongfu Zhou (resigned from thesis)

Dr Egwebe Augustine: 2nd supervisor

2nd Swansea University Supervisory Team:

Dr Egwebe Augustine: 2nd supervisor

Professor Paul Rees: Associate supervisor

Declarations

This work has not previously been accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed.....G Blanche.....

Date.....1/10/21.....

This thesis is the result of my own investigations, except where otherwise stated. Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

Signed.....G Blanche.....

Date.....1/10/21.....

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Signed.....G Blanche.....

Date.....1/10/21.....

The University's ethical procedures have been followed and, where appropriate, that ethical approval has been granted.

Signed.....G Blanche.....

Date.....1/10/21.....

During this study I contacted National Grid who replied, and they supplied references.

I failed to get a reply from Naudin about his work and failed to get a reply from The National Aeronautics and Space Administration (NASA).

Prologue

Whilst I was writing this work, it became clear to me and quite a large number of the rest of the people of the world, that an evil force had infiltrated all levels of society, government, and universities. They had an agenda to change the world. This evil cabal's agenda is to control, oppress, destroy people, and control scientific knowledge, and are guilty of perpetrating three of the biggest crimes against humanity in the last 40 years.

I felt the research I was investigating had been politicized by my Swansea University supervisors whilst I was researching, experimenting, and writing this work due to their actions, threats, and comments. Not only that, but world events also impacted on this work due to covid 19 lockdowns. Being a research scientist, one must follow instinct, common sense and always question and challenge accepted science in the pursuit of truth. A student is not controlled like an employee of a corporation is, which have rules and agendas that must be followed. Yet the controlled employee of a corporation might be totally unaware of the overall objective due to de-part mentalised techniques of objectives within organisations. Today a chain of command is endemic in universities that now lead from the powerful self-elected elite cabal of this world. Research investment in British Universities is governed mainly by the funding being supplied by powerful corporations such as The Bill and Melinda Gates Foundation, and The Clinton Foundation. The UK is the biggest beneficiary of the Gates Foundation with \$744m disbursed to 38 UK universities [References 1,2,3,4,5,6,7,8]. Universities are in partnerships and business for financial profit with these people, using research to obtain patents for profit. It is the cabal agenda that is driving the research agenda. Being a student, one should always question the motives and ethics behind agendas that are being instigated by such businesses and people. Trading under the guise of, '*foundations*' or calling themselves '*philanthropists*.' The founders of these Foundations such as Bill Clinton, Hillary Clinton and Bill Gates have been linked to convicted paedophiles, namely, Jeffrey Epstein and Harvey Weinstein (see Index 24.2), showing them to be connected to a sadistic cult.

**97% OF ALL SCIENTISTS
AGREE WITH THE PEOPLE
FUNDING THEM**



We now have an academia that is no longer fit for purpose, unable to report facts and speak the truth due to censorship. There is now a conflict of interests stifling openness, truth, and facts, with this conflict of interests leading back to the self-elected elite cabal who are dictating research at academic institutions due to the funding they provide. Swansea University changed the name of their law society to The Hillary Rodham Clinton Law Society in 2017 [9,10]. Hillary Clinton has been awarded eight honorary doctorates by different universities around the world. Some people feel being awarded a doctorate without working for it at the institution is a bad deal for students, considering the effort

and financial debt a student has to accumulate to achieve these awards [11, 12, 13]. This could be viewed as, awards for funding.

Without doubt, academics at universities are profiting and being manipulated by these benefactors and this is now endemic countrywide, with a cabal agenda being played out by their university puppets [14,15]. Not only this, but the same funders are also funding

mainstream media. It allows them to control the narrative through media and is creating a fascist state hiding behind a so called democratic process [16]. The governments are also in these elites' pockets, striking deals between each other and using the controlled media as their propaganda weapon. Rather than perhaps, what is morally right and good for British society, there is a blurring of the lines of what should be acceptable or not acceptable, and most worrying is the unquestioning of the narrative by the employees of these institutions who seem only concerned with securing funding for job security. This type of unquestioning of agendas was given by defendants as an excuse to their behaviour at the Nuremberg trials in 1947. Do you want to be offering this excuse? There comes a time when morals matter, that time is now. A comparison of, doing what I am told to do and be funded, or do not agree with the agenda and lose your funding is revealed by Dr Judy Mikovits in the documentary film by Mark Willis, 'Plandemic Indoctrination' [17,18]. This film received 6,637,359 views during its premiere in August 2020, before being censored and removed from all social media sites. One can read the narrative the elites want people to think is real about Dr Judy Mikovits on Wikipedia [19]. The same type of narrative of discrediting someone can be read on Wikipedia about Joseph Westley Newman [20]. Wikipedia is obviously the pseudo-science misinformation website the elite want you to read and is mixed with real science and fake science to make you believe this is the place to find what you think is the truth about science. Although, I was trained to ignore Wikipedia whilst earning my Level 3 and BSc awards. Without continually questioning science, it can make mankind worse off and pseudo-science can prevail by deceit, as is now the case in the UK fake news fascist society.

Being a free thinker, the pursuit of truth through science is very important to me. I am 'awake' to agendas being implemented by self-elected elites through corporations; using worldwide government manipulation; to control knowledge and control academia at the same time. Follow the money and you'll find the culprits. As a student, you should simply follow your own thoughts and your own research. One should be careful not to fall under the elite's agenda bus. If you are unaware of agendas being rolled out, you can easily be misled and railroaded into following only a certain type of research. This is exactly what type of control structure is now being seen in 21st century universities in the UK.

Klaus Schwab who founded The World Economic Forum, offers, 'The Great Reset' in his book '*The Fourth Industrial Revolution*', and his vision is, people owning nothing and being happy. World leaders are in coercion with his ideology using the slogan '*build back better*', which is being parrot fashioned all around the world by globalist governments and elites [21,22,23,24]. The Great Reset offers a way of stopping climate and ecological disaster (which is rejected as real science by many scientists with solid historical data evidence to back this standpoint), with population reduction being part of the globalists ideology, and this agenda is already seen to be underway with less democracy being replaced by world fascism. It is an agenda driven by self-elected elites that is leading to higher energy costs rather than lower energy costs, control over assets by a smaller number of people, and creating a more polarised and divided society.

Covid 19

I was just getting my experiments underway at Swansea in March 2020 when the world was just about to be turned upside down by the covid 19 con trick. The University was closed down around the date 28th March 2020, with the narrative from government, saying, '*for 2 weeks to flatten the curve*'. In March and April 2020, there was a massive fear campaign launched against the people by media and government. All was orchestrated by the elites, Davos, World Economic Forum, all mainstream media, and the World Health Organisation. The world population was soon to be deceived and find out how science was now being used to control, lock up and destroy lives.

Being a scientist, I followed the covid con with interest and went to demonstration protests at Trafalgar Square and in my local area from August 2020 onwards. Anyone who knew how to research information rather than just listen to mainstream media would soon find that medical tyranny was being applied to the world population. Bio terrorism was now being wielded. Robert F Kennedy Jr reports how Bill Gates vaccine programme has been destroying lives in India since 2000 with experimental vaccines [25]:

'Promising to eradicate Polio with \$1.2 billion, Gates took control of India's National Advisory Board (NAB) and mandated 50 polio vaccines (up from 5) to every child before age 5. Indian doctors blame the Gates campaign for a devastating vaccine-strain polio epidemic that paralyzed 496,000 children between 2000 and 2017. In 2017, the Indian Government dialled back Gates' vaccine regimen and evicted Gates and his cronies from the NAB. Polio paralysis rates dropped precipitously. In 2017, the World Health Organization reluctantly admitted that the global polio explosion is predominantly vaccine strain, meaning it is coming from Gates' Vaccine Program. The most frightening epidemics in Congo, the Philippines, and Afghanistan are all linked to Gates' vaccines. By 2018, ¾ of global polio cases were from Gates' vaccines.'

Paul Burr's document from April 2020 highlights how YouTube videos have been censored, just click on the links supplied in his document [25] to find them removed and censored by Big Tech. Dr Peter McCullough, the most cited physician in his field, was soon to stand up and fight back against this tyranny along with many other scientists and medical doctors. The Great Barrington declaration being a great example of this [26]. People were soon to be coerced into mass vaccination with an mRNA experimental gene therapy that had never been tried before. Dr Lee Merritt [27,28] reported that when animal trials were carried out on the sars-cov2 virus, 80% of animals died when reinfected. Swansea University had entered into this arena of mRNA interference in 2018 as can be seen in Professor Paul Dyson's funding from The Gates Foundation. The objectives of this mRNA research are to eradicate a species, as the statement seen in the photo below says. This is eradicating a natural species, here we see an ideology and the development of a technology that can be considered dangerous to the natural balance of nature. When one compares this mRNA technology to vaccines for humans, with government claiming they are safe and effective, one would like to see evidence of what link there is to promoting health? When this research is for eradication purposes? [29]

Links

Swansea University
Prifysgol Abertawe

Professor Paul Dyson
(pictured) said:

"The Grand Challenges Explorations funding from the Gates Foundation will enable us, in collaboration with the Liverpool School of Tropical Medicine, to develop and test the technology on a small scale in the next 18 months.

We'll be using RNA interference, which is a natural process that cells use to turn down, or silence, the activity of specific genes. The idea is to apply this using the Sodalis bacteria in the gut of the fly, with the aim of reaching the trypanosomes, which are the parasites that cause sleeping sickness.

If we can use the bacteria to alter the trypanosome, it means we can gradually eradicate forms that are infectious to mammals, including humans.

In the long term, flies unable to transmit infectious trypanosomes will be bred and released to replace native populations."

Experts **not** being paid off by institutions and **not** controlled by governments, warned that this use of un-trialled gene interference **not** being conducted over a proper experimental time such as 10 years to see long term effects, which is usually the case in proper vaccine development, is tantamount to genocide. Dr David Martin [30] through his research shows there were **no** new novel coronaviruses, contradicting what was now being reported by governments and media worldwide. Instead, Dr David Martin's research shows there were over a hundred patents filed starting in 1999 for coronavirus and vaccines. He reveals the manufacture of sars-cov2 through patent applications. He said,

*"And what we found, as you'll see in this report, are over 120 patented **pieces of evidence**, to suggest that the declaration of a 'novel coronavirus' was actually entirely a fallacy. There was no novel coronavirus. There are countless, very subtle modifications of coronavirus*

sequences that have been uploaded, but there was no single identified 'novel coronavirus' at all. As a matter of fact, we found records in the patent records, of sequences attributed to novelty, going to patents that were sought as early as 1999. So not only was this not a novel anything, it's not been novel for over two decades."

It's all about patents, if a pharmaceutical company can patent and make money from treatment, especially one that we have to keep on using then that's what we get. The same powers that control the AMA control the pharmaceuticals, there's a multi-trillion dollar incentive to suppress cures that can't be patented.

Kimberly Carter Gamble

CE collective ... EVOLUTION

One must remember, if it's patented, it is manmade. Using deceit and payoffs, the elite developed an evil plan. For example, paying 'The Centre for Disease Control and Prevention' (CDC) [31] to keep patent applications between them and The American Patent Office private. The whole idea of a patent is to let people know you own some type of intellectual property, keeping this secret goes against the whole

ideology of obtaining a patent. Although owning a patent on a manmade virus is not going to win popularity at present. This evidence is being recorded by the Corona Committee represented by Dr Reiner Fuellmich, with 'Class Action Lawsuits' to follow.

The vaccine would be the so-called saviour to the planned pandemic. People were sold the notion that by taking this vaccine everything would get back to normal. Mainstream media did not mention the vaccine was an experimental drug that had never been tried before, it was promoted as 'safe and effective'. The covid 19 vaccine trials are ongoing until at least 2023, and only being administered for use under emergency powers [32]. The self-elected elites, who

own pretty much all the news networks, social media, etc, implemented censorship and psychological warfare not seen since Nazi Germany, and the agenda was easily achieved in coercing and fooling the majority of people. Dr Vernon Coleman (also discredited by Wikipedia) [33], David Icke [34] and pretty much anyone else who stood up to reveal the truth about how the elite were trying to change our world through medical tyranny were instantly banned from social media. The con was perpetuated by using the polymerase chain reaction test, (PCR). The inventor of this test Karry Mullis, Nobel Prize winner 1994 [35], said himself, PCR can never be used as a tool in “*the diagnosis of infectious diseases*” [36]. Reuters reported that 80% of the vaccinated are cases of covid 19 in Singapore. This contradiction of effective vaccination and PCR test fraud [37] is just some of the evidence that shows this to be a massive



worldwide crime being played out. This is now becoming scientifically obvious when the evidence and data we now have after 18 months into the deception is analysed. Even the CDC relinquish the PCR test is flawed in detecting infectious disease [38].

The real desolation and destruction shown by the yellow card reporting scheme is never discussed in mainstream media and is only being reported and scrutinised by independent news sources such as ‘UK Column’ [39]. This is just the tip of the iceberg, as a study at Harvard University shows that only about 1% of adverse reactions are ever reported to such schemes.

© 38% 20:27

This weeks MHRA Yellow Card figures in a full breakdown.

Condition	Reactions	Fatal
General disorders	340772	551
Nervous system disorders	236355	246
Muscle & tissue disorders	141450	1
Gastrointestinal disorders	111533	29
Skin disorders	79248	2
Respiratory disorders	42146	183
Reproductive & breast disorders	37147	1
Infections	26356	177
Psychiatric disorders	24433	7
Eye disorders	19513	0
Blood disorders	18856	16
Vascular disorders	18292	79
Investigations	15058	3
Cardiac disorders	14727	259
Ear disorders	14433	0
Injuries	13973	3
Metabolic disorders	10629	4
Immune system disorders	4854	6
Renal & urinary disorders	3468	12
Surgical & medical procedures	1136	0
Pregnancy conditions	1105	12
Neoplasms	662	11
Hepatic disorders	614	9
Endocrine disorders	586	0
Social circumstances	563	0
Congenital disorders	160	1
Grand Total	1178069	1612

23:15 · 05 Sep 21 ·

Universities are now being used to promote the experimental mRNA gene altering drug to students whilst developing this unsafe technology for the cabal. Universities, governments, and media are being controlled through funding, coercion, bribery and probably blackmail to rollout this crime by these oligarchs [40].

[Coronavirus \(COVID-19\) vaccine adverse reactions - GOV.UK \(www.gov.uk\)](https://www.gov.uk/government/statistics/coronavirus-covid-19-vaccine-adverse-reactions)

I feel it is my duty as a trained scientist to report this to my Peers, to demand action and change, to halt this cabal agenda in British Universities.

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1 Declaration of Investigation

Draft Thesis

I began my Master of Philosophy research at Swansea University in October 2019, and at first the pace of the research project was slow. There were no purpose-built facilities at hand to carry out the research I wanted to pursue, so the first six months were used to get to know the staff; research background science as well as source electronic parts; to build an electronic circuit for experimental use in an electric field charge using lithium batteries. I had been able to do some experimental groundwork, obtaining some valuable data at the University of South Wales (USW). The University of South Wales had a purpose-built laboratory for developing battery technology and this was fantastic for the kind of research I was pursuing. I was pursuing the physics and claims made by Joseph Westly Newman (1937-2015) and other scientists, about Newman's energy machine. I was looking for an endothermic reaction during an electric field charge, using lithium batteries to study this physical reaction.

I was able to record some useful data at Swansea just before the lockdown and I was then forced to carry out the rest of my work from home. My experiments at home became inventive and turned out to be a great success in gathering data that would prove my theory and more. The work I was pursuing had been heavily censored throughout the short history of electricity. One only needed to research Nikola Tesla's life story to confirm this [41]; there was an organised elite ruling science and academia, science was no longer in safe hands and had not been for a considerable time. Rather, it was now a weapon for the rich and powerful to wield against the people of the world. Censoring and the spreading of misinformation over the last century, had always been a tactic by the ruling cabal to instigate confusion, cause divide, and ultimately, control the people for their own ends.

It became evident after submitting my draft paper, as required in August 2020, this was going to be a contentious piece of work due to the subject contained. Control the narrative and you control the people.

Here are some of the comments made by the 1st supervisory team on the draft of my thesis:

"Please note: Joseph Westley Newman, whose work has been universally rejected by all credible scientific examiners, including the American National Bureau of Standards after they thoroughly examined his apparatus. we would, therefore, be extremely wary of endorsing any published work which referred to Newman's 'Energy Machine'. The supervision team does not support to include the work of Joseph Westley Newman in your thesis."

I decided to continue with this work despite the comments made. I believed not only was I demonstrating a correct new electricity physics understanding, but I was also dealing with a crime scene, be it 32 years in the past regarding the genius work of Joseph Westley Newman. The work of Joseph Westley Newman [42], had been discredited by the National Bureau of Standards (NBS) and the American Patent Office in 1989 when he tried to patent his 'Energy

Machine'. The science I was uncovering was not something I could bring forward without now delving into this area of criminality at the highest level of American government. My thesis was now changed due to the politicising of the subject by the 1st supervisory team. A professional tone had been difficult for the staff at Swansea University to find, and my defence was with vigour. There were many heated debates on Zoom rather than face to face, due to covid 19.

The only way forward was to reveal scientific truth by experimental evidence and analysis, including a revisit of the NBS report on Newman's machine and the court case of '*Newman versus Quigg*' (chapter 3). Feelings and emotions outside science were now being invoked by the very implications of the possible corruption. The very fact that opposition to revisiting Newman's work became such a contentious issue, immediately raised questions in my mind of 'agenda driven pseudo-science' and 'corruption ruling the narrative'. Did the supervisors really think Newman's work was pseudo-science as claimed on Wikipedia? Did they research this subject matter before offering their comments? Maybe the advice offered by my 1st supervisory team was based only on the NBS report, failing to understand the mechanics of the Newman machine, and had they not researched thoroughly the links they provided as, 'credible science'? The revisiting of what is called 'pseudo-science' was something I personally might have to face as a career mistake if proved wrong. Not only this, but I also faced being unsuccessful before actually submitting my 'Master of Philosophy', very strange! Yet I continued with my thesis, as I believed I was uncovering '**real science**' that could make a difference and have many benefits to mankind.

I place this research in front of you for you to discover a deeper understanding of this subject and what it means to science. I start with how Swansea University reacted to this work; I then proceed to what is the most important part of my professional life and write what I believe to be a precise piece of electricity physics, based on facts and not opinions; which has been missing from the theory of electricity physics since Maxwell wrote his unifying theory in 1864. This thesis is the pursuit of truth through scientific research by experimental observations, just as Faraday, Ampere, Tesla, and many others had done a long time ago.

I start with this email I received from my 1st supervisor who resigned from the thesis at this time:



Zhou Z.

Wed 31/03/2021 13:19

To: BLANCHE G. (946484)

Cc: Kalna K.; Egwebe Augustine.



NITS (Notice of Intention to S...

121 KB

Dear Geoff,

Thank for sending us the form. Please find the attached NITS (Notice of Intention to Submit) form with our comments.

Please note: As you insist to include the disputed parts in your thesis, the supervisor team has to make it clear to you that to submit the thesis in its current form is going against the advice of your Supervisors, and that if you was unsuccessful in your degree that all documentation would be made available, in the event of any appeal.

Best wishes

Zhongfu, Karol and Augustine

Supervisor Comments

The student developed electronics circuit for charging battery and monitoring battery charging process, the circuit works well. The student submitted his thesis draft in August 2020.

Supervisors provided an excessive feedback on the Master by Research thesis draft one week before the meeting on 7th September 2020. In this meeting, the feedback on the thesis draft was discussed in detail and student's queries answered.

1) It is recommended that the student should review and apply the suggested changes from the supervisors.

2) It is a consensus among the supervisory team that the literature review section is incorrectly presented and, hence, it is recommended that the student should review and apply the suggested changes from the supervisors. Furthermore, the thesis should be thoroughly referenced to have a consistent flow of contemporary scientific theory and practice.

3) The supervisory team suggested some sections of the draft thesis (such as the claims from Newman's book entitled 'Public Evidence of Endothermic Electric Effect Reaction' that are disputed by experts in administration and court proceedings, and the section entitled 'The Photoelectric Effect' that is considered irrelevant) should be removed. The supervisory team also suggested there is no relationship between his experimental results and Newman's claims. However, student has opted to keep Section 'Public Evidence of Endothermic Electric Effect Reaction' in his thesis.

The supervisory team notified the student that it is up to the student to decide on the content that he includes in his thesis.

Reply:



BLANCHE G. (946484)

Tue 13/04/2021 09:42

To: Zhou Z.

Cc: Kalna K.; Egwebe Augustine.



Thanks for this information. I will be submitting my masters with newman included so it's nice to see you have already decided I will fail because of the pursuit of scientific truth. You seem to be preparing for an appeal before I have even submitted. This is strange behaviour and very suspect, almost as if you are trying to cover something up that is not allowed, seems like academia are controlling scientific knowledge and is lying to the people. Just to let you know for your defence at any possible appeal, as you have already hinted at my failure, here is a link which in turn will lead you to the 2 PHD studies by Alaska Fairbanks university which universally show NIST(NBS) to be nothing more than a gang of cover up criminals. I suppose you might also need to discredit these 2 PHD studies to make NIST look like they are the pillar of scientific truth. These frauds will be revealed and is only a matter of time. NBS is the only discrediting science document on Newman which is easily dismissed as fraud as you will see. If you want to tie your names to this sinking ship it is your prerogative.

<https://www.ae911truth.org/>

<https://www.ae911truth.org/wtc7>

Regards
Geoff

John Archibald Wheeler [43] once said,

'We live on an island surrounded by a sea of ignorance. As our island of knowledge grows, so does the shore of our ignorance.'

'In any field, find the strangest thing and then explore it.'

This is what I have done, I have explored the strangest field and I have found something amazing. Within this work, scientific conclusions are presented that agree with the laws of physics as we know them on September 10th, 2021. I do insist on keeping the work of Joseph Westley Newman in this thesis work and the reference to the Photoelectric Effect. This investigation came about due to the work of Joseph Westley Newman and his invention 'The Energy Machine'. The work I have done in plotting an electric field charge proves that an electric field charge is first an endothermic reaction with respect to time. You cannot have electricity without an electric field charge, and you cannot have an electric field charge without producing an endothermic electric charge, what is not thought of and currently not understood is: ***Electric charge is first endothermic before exothermic.***

Unbeknown at the time, Newman was the inventor of the first, 'Endothermic Electricity Generator.' Newman's machine produces more energy on the output than is imputed by benefitting from this endothermic reaction during an electric field charge with respect to time.

I first became interested in Newman's invention around 2009, after watching videos of Newman's struggle to promote his invention and try and obtain a patent with The American Patent Office on his Energy Machine design, which he failed to do. It was 'The National Institute of Standards' (NIST, NBS) that finally put paid to him obtaining a patent. Having studied the NBS test on Newman's machine, I soon found out that the test NBS carried out was nonsense (chapter 3), and it seems this agency is being used to commit criminal frauds. From my research contained within, academia should certainly not quote work by NBS as 'credible science', and if academia chooses to continue to agree with the NBS examination on Newman's

machine, they will be perpetuating ‘fake science’ and not representing the people of the world, but just a small group of self-elected elite criminals who are pushing and controlling the current agenda. NBS will now be indelibly linked to the perpetrators of 9/11 (chapter 3). At the time of writing (September 2021), this American Government agency, NBS, is being investigated and sued for what is claimed to be fraud and a ‘cover up’ for the perpetrators of the crime 9/11, when nearly 3000 people were murdered, with 1100 never recovered or identified. Richard Gage AIA [44] produces a slide (below) from part 2 of the ‘Twin Towers Explosive Destruction’, where critical information is ignored and shows the NIST report on how the buildings collapsed, to contain false and invented information. ‘The American Society of Civil Engineers Journal’ refuse to publish new findings that they agree is scientifically correct and that refutes this false information by NBS, reason given, “out of scope”. This is a criminal agenda interfering with science / mathematical based facts and withholding the publication of the truth, this should be objected to in every possible way. This is definitely not in the interest of the academic world. The future of students to be, and the pursuit of truth through science is now at stake. This is a totally unacceptable situation to find existing in science and academia.

Part 2: The Twin Towers' Explosive Destruction

Zdenek Bazant / NIST

“Crush Down – Crush Up” Theory Violates Laws of Physics
Calculation *Formulas* are Correct – But Use False *Input Data*

The 6 Errors of Bazant – Refuted by engineers:

[ASCE Journals Refuse to Correct Fraudulent Paper Published on WTC Collapses](#)
 Tony Szamboti and Richard Johns, September 2014

[Some Misunderstandings Related to WTC Collapse Analysis](#)
 Gregory Szuladzinski, Tony Szamboti, and Richard Johns, June 2013

Errors upheld by ASCE: “Won’t Publish”:

The American Society of Civil Engineers Journal of Engineering Mechanics refuses to publish these direct refutations of Bazant’s papers.

The reason given?
“Out of scope.”

9/11: An Architect's Guide Part 2: The Twin Towers' Explosive Destruction 205

Slide Link: [9/11: An Architect's Guide \(ae911truth.org\)](http://ae911truth.org)

The current understanding in energy physics will tell you that it is impossible for Newman’s Energy Machine to produce more energy on the output than is imputed, yet this understanding and teaching of electricity is a misinformed point of view only, and has been incorrectly perpetuated through time. During my investigations, I could not ignore the physicists, engineers and scientists who had signed affidavits attesting to the ‘rightness’ of Newman’s machine,

agreeing with Joseph Newman that he was correct in his claims. This is well documented in Newman's book. I also could not ignore the comments made by my supervisory team. The reason I could not ignore both sets of views is simple, **'academic integrity'** (see Index 24.1). No human being has the right to be heard more than another human being, I do not want to live in a version of George Orwell's 'Animal Farm' or '1984' for that matter.

So, the investigation which was first just about an observation that I linked to Newman's machine now became an investigation into what happened to Newman's invention and was he a victim of a crime? Had Newman invented a machine that produced more energy on the output than is imputed? Was Newman on to some new understanding of physics with his Generator design?

I believed Newman had done this and I believed this for good reasons. I continued my research for how such a machine could produce more energy on the output than imputed, and what it presents to science; electricity physics; entropy and thermodynamics.

A scientific method was instigated for this thesis

1. How could The Newman Machine Defy Known Physics?
Does The Newman Machine agree with known physics, is it just not understood?
Formulate questions.
2. Perform background Research into electricity physics, the equations that govern the reaction of electricity, the conservation of energy, The Photoelectric Effect, Maxwell's equations. Make observations.
3. Look for evidence that does not prejudice any particular source, not all knowledge has been published in journals or for that matter will get to a mainstream publication in the current political situation as already demonstrated.
4. Construct hypothesis- How does an electric field charge, charge with respect to time?
5. Test hypothesis by plotting the charge of an electric field, with lithium battery experiments.
6. Analyse results.
7. Draw conclusions, - is hypothesis corroborated? Are there any observations that support current science understanding?

2 Hypothesis

Who would have believed at the beginning of the 21st century that there would be a branch of electricity physics yet to be discovered or understood?

Had the invention by Joseph Westley Newman 40 years prior to 2021 produced the radiant energy or cold electricity that Nikola Tesla had spoken about in the 1890s? [45]

Electricity, unlike many other aspects of physics has rarely been put into question since the writing of the main laws such as Faraday's law, Ohm's law, Ampere's Law. These laws all supported by Maxwell's unifying mathematical equations, first written in the original form of 20 quaternion expressions [46]. This is now universally agreed in academia to be the contemporary foundation of electromagnetism and was written by James Clerk Maxwell applying symmetry in mathematical formula. When these pioneers were experimenting and writing these laws to arrive at the understanding we have today about electricity, it had still not been conceived that electricity exists as an endothermic and exothermic reaction. Yes, there was and is a lot of built-up knowledge of how to use and manipulate electricity, for example; Voltage discovery by Alessandro Volta; Michael Faraday's numerous discoveries; along with his discovery which became known as Faraday's Law; Georg Ohm's law of proportionality; Andre-Marie Ampere's law of current flow and magnetic field proportionality; and Nikola Tesla's advancements in the design of systems for production and distribution of electricity, mainly alternating current; energy physics such as Boltzmann constant; Max Planck and his defining of entropy; Albert Einstein's characterisation of the Photoelectric Effect; and Neil Bohr's model of the atom. All these discoveries made by scientists of the past have been proved very important to mankind, yet there seemed to be something missing to connect all this electricity physics knowledge to actually explain electricity to the finite understanding from the reaction in the atoms to electrical power.

In 2021 it is even more vital than ever for mankind to develop his knowledge and understanding in the production of useable energy. This has become evident in our recent time; if you are a believer of manmade climate change through co2 emissions or not (which I am not, although now disagreeing with this agenda is again going against the narrative of the cabal elite); the truth is we are polluting the planet for our desires of high energy, new technology but most of all by greed. Understanding and controlling electricity has made our technological world and very existence flourish. This world we are developing allows us to live a more comfortable and longer lifespan, yet this has created crises of its own. Due to suggested 'limited resources', the thirst for new technology especially of renewable self-sustaining energy has continued to grow. The very nature of electricity is a reactive process that can be difficult to control, and this has set mankind a continuing challenge to refine electrical systems for optimum efficiency and control of this precious commodity. Renewable energy has been the focus to a suggested cleaner, healthier, and less damaging way forward in preventing harm to the natural world, with manmade climate change being the banner of this agenda.

All energy production systems in existence today are exothermic and involve inefficiency and losses of energy to the surroundings, this includes all existing renewable energy systems such as wind, solar, biomass and hydro technologies. With this in mind, ***the idea of designing energy production that does not cross the threshold into inefficiency is very appealing.*** Yet this type of technology has been slow to emerge and will need a new considered basic understanding of the physics that will make these future systems possible.

Whilst undertaking studies in Renewable Energy systems I have observed what I have named, ***'The Endothermic Electric Effect'***. This reaction is seen in an electric field charge and has been identified in several electrical systems being referred to as an 'endothermic cooling'. It was in 2007, that NASA designed an experiment that would plot the charge of an electric field. Unbeknown at the time; maybe overlooked or just not understood; the evidence this experiment gives us along with follow up experiments contained within, show us a new understanding of electricity physics and energy generation.

The Endothermic Electric Effect is a phenomenon that occurs during an electric field charge. This effect will be repeated during the charge in accordance with ionisation states within the system and can be used to gain extra energy in a system with respect to time. The knowledge of this type of endothermic electricity charge will allow us to build machines that will gain energy from their own material as-well as from environmental energy – ***over unity energy generators are possible.*** Endothermic electricity generators will in the future give us the scope to connect to established renewable exothermic energy generators. Yet until this technology is researched and developed, we will not know whether exothermic generators are still required, as the potential of endothermic generators is still yet to be properly explored.

You will discover in this work how the Endothermic Electric Effect has been seen in different systems in the public domain, and how the Photoelectric Effect or for ambiguity arguments, an electromagnetic force (EMF), is the catalyst to the Endothermic Electric Effect reaction. You will learn how we already have versions of equations for the reaction, namely by Einstein and Maxwell. I invite you now to throw off the chains of suppression and pseudo-science and step into the future of energy generation, for truth, freedom, and liberty.

3 Public Evidence of Endothermic Electric Effect Reaction

There is no literature review that explains the '*Endothermic Electric Effect*' in electricity physics. James Clerk Maxwell [47] wrote the unifying theory of electromagnetism by adding a displacement current to Ampere's law, this he did in 1864 and gave symmetry to the mathematical expressions of electromagnetism understanding which is still contemporary today. Electricity was never and is still not understood as an endothermic then exothermic reaction, although it is slowly emerging and being recognised that endothermic reactions can be used for increased efficiency in electricity production [48]. You will find different examples of endothermic reactions being used within designs of energy systems contained within this research, but never has it been thought of as a direct reaction due to the Photoelectric Effect or an EMF.

'*The Endothermic Electric Effect*' has been seen in several electrical systems and has been referred to as an 'endothermic cooling'. This reaction I first identified and observed whilst investigating the Newman Generator.



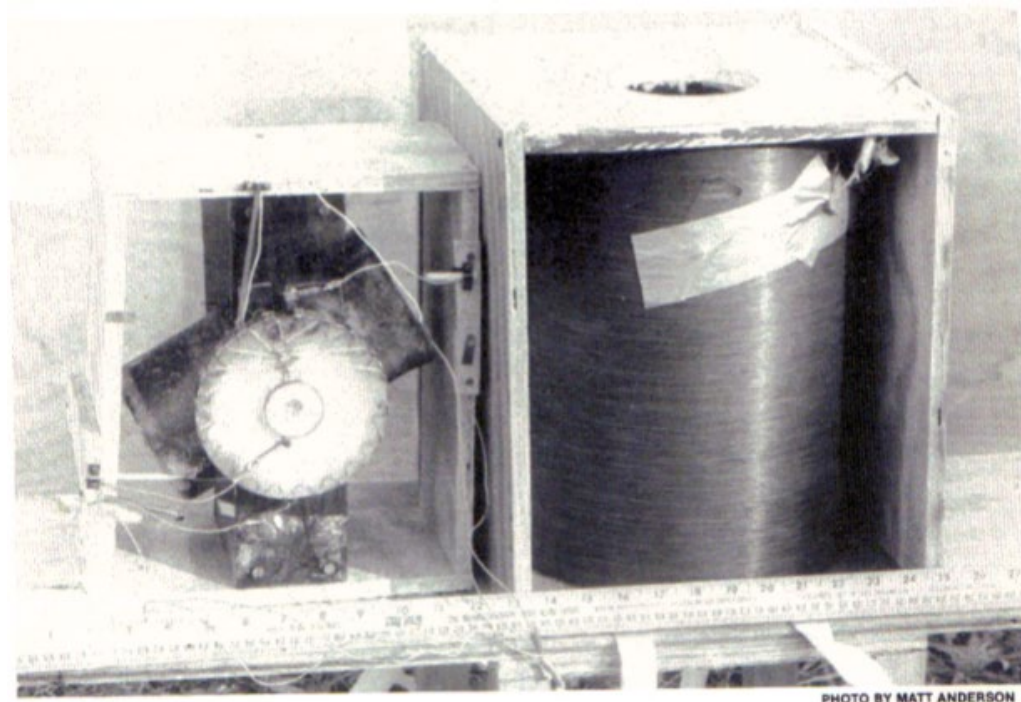
Figure 1 and Figure 2: *Joseph Newman (1937-2015) an American inventor who during the 1980s published a book he named 'The Energy Machine'. His story is beyond the scope of this work, yet if the reader is interested, his book is free online.*

Newman claimed his 'DC Electromagnetic Generating Machine' produced more useable electrical energy on the output than was placed in the input. To benefit from this open system reaction, Newman incorporated parameters in the design of the generator to extract the energy gain phenomenon. The DC machine operates within a 5-parameter design:

1. catalyst current
2. voltage pressure
3. large surface area of copper atoms in the form of a coil
4. specific timing device

5. A polarity reversal every 180 degrees on the coil to interact with the spinning magnet on the rotor. This reversal is embedded in the design to ‘kick on’ the permanent magnet which is attached to a rotor arm, and this gives forward momentum due to attraction to the opposite pole of the coils magnetic field.

Science is the pursuit of truth, supported by experiments and observations. There were over **thirty individuals** who signed affidavits attesting to the ‘rightness’ of Mr Newman’s invention. These individuals were electrical engineers, physicists, inventors, and scientists. Newman included some of the test results by these experts in his book.



The following is a smaller unit (see photograph 15-C2 below) composed of 30-gauge, insulated, copper wire weighing approximately 145 lbs. (atoms) and having a rotating magnet of 14 lbs. (atoms). This portable unit, with very little current input, clearly demonstrates an energy output which is greater than the external energy input. With 300 volts input of pressure, only 1 ½ milliamps of current (volume of gyroscopic particles) went into the copper coil (of atoms), which is less than ½ watt input for an energy output in excess of 10 watts.

Figure 3: *The Energy Machine. Page 36 of the Energy Machine*

3.1 JL Naudin’s Newman Generator

In 1998 a researcher named JL Naudin [49] pursued Newman’s design. Naudin’s work seems to be unknown, which when examined is a qualitative example of scientific research. All his test and experimental results are found online only, with no report available in document form. His design and experimental procedures are available:

<http://jlnaudin.free.fr/html/qmmv11.htm>

Naudin undertook temperature testing on his Newman Generator to detect if there was any cooling effect to the coil during operation.



During all the test phase, the lab temperature was constant (21.5 degrees). The observation of the Newman's Machine and the collect of the temperature data has been done at a distance at least of 2 meters for avoiding any change in the surrounding of the experiment.

The Newman's machine has been stopped after the test (a 60 mn run) and 15 mn after the temperatures were EQUALIZED AGAIN at 21.5 degrees. This confirms the cooling effect observed in spite of the mechanical work generated and the joules' effect dissipated in the coil.¶

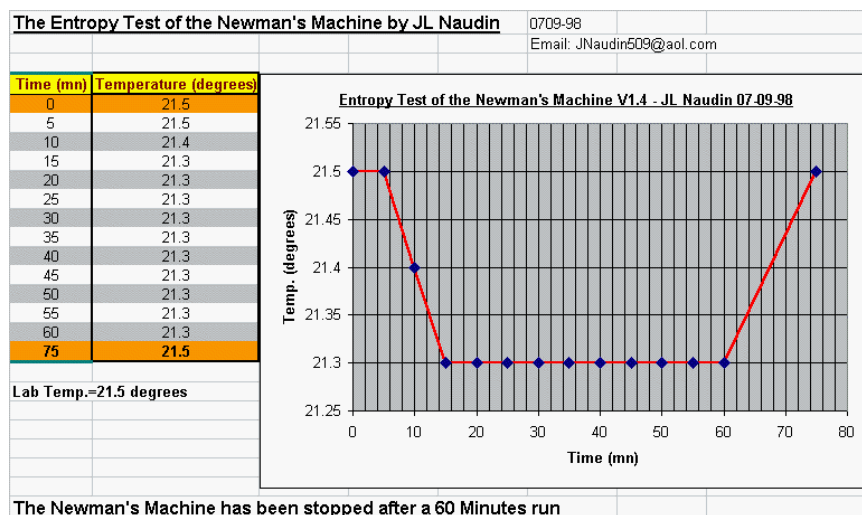


Figure 6: *Temperature data for entropy test.*

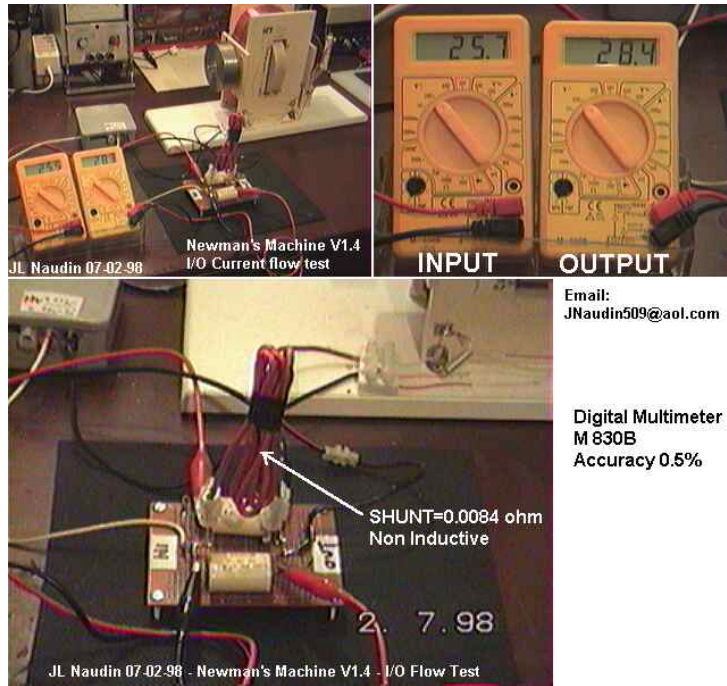


Figure 7: Naudin's Multi meter readings for input and output power on Newman Generator test.

Points to notice:

1. A cooling effect measured on the coil seen in figure 6.
2. Measured output and input power displayed on multi meters, seen in figure 7.
 - Both generators, as demonstrated in Figure 3 and 8, have high voltage input.
 - Newman used more turns of the coil and had a much bigger inductive reactance due to surface area than Naudin's design.
 - The rotor rpm is slower with Newman's than Naudin's generator.
 - Newman's generator had a faster firing pulse than Naudin's generator.

Page 39 of the Energy Machine, Dr Roger Hastings states, 'The heat generated in the coil is 27 times the input power.'

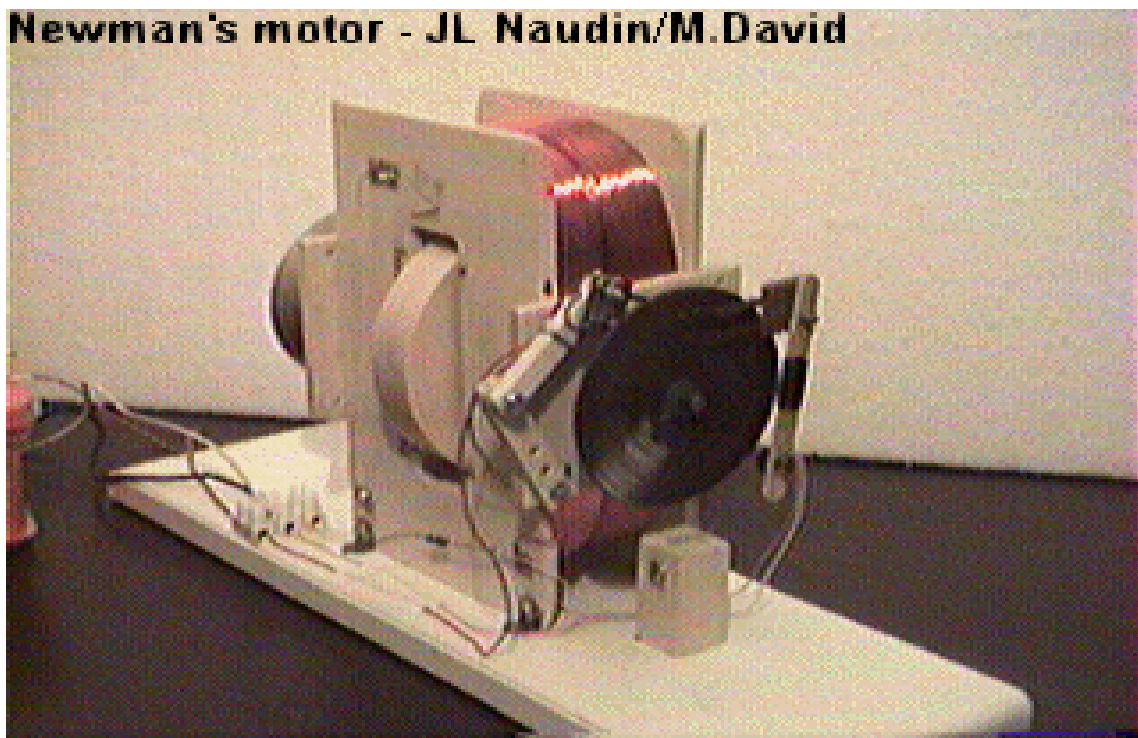


Figure 8: Naudin's Newman Generator

3.2 Is Academia correct in dismissing Newman's Work?

Newman's invention 'The Energy Machine' has stayed an enigma to academia and science since its inception. This is because:

1. The physics of how his machine works is not understood.
2. It has been discredited by the NBS test and the ruling made by the district court in 1989.
3. Academia has supported the NBS report and court ruling.

A very poignant quote by Newman himself is quite apt to place here:

"The entire history of science has proven over and over again that, whenever it has been thought that something was not possible, it later turns out to be possible".

The 1st Swansea supervisory team stated that the Newman machine had been universally discredited by all ‘credible scientific examiners.’ The following links (below) to back up this statement were provided. This perhaps seemed like good advice yet having studied everything to do with Newman’s machine for some considerable time, I was confident to continue researching the claims made to come to a definitive answer on how Newman’s Energy Machine operated.

Author John Kay said, [50]

‘The processes of proper science could hardly be more different. The accomplished politician is a negotiator, a conciliator, finding agreement where none seemed to exist. The accomplished scientist is an original, an extremist, disrupting established patterns of thought. Good science involves perpetual, open debate, in which every objection is aired, and dissents are sharpened and clarified, not smoothed over.’

The statement that the 1st Swansea supervisory team made:

‘We would, therefore, be extremely wary of endorsing any published work which referred to Newman’s ‘Energy Machine’.

This statement expressed an idea that NBS were the definitive scientific knowledge on Newman’s machine and took a political standpoint. I deemed all information on this subject important and believed all information should be researched and analysed in the pursuit of scientific truth.

“Especially on something that could give mankind a deeper understanding of electricity physics.”

Listed below are the links for the apparent credible science examination of Newman’s work supplied by 1st supervisory team.

1. US National Bureau of Standards (June 1986). ["Report of Tests on Joseph Newman's Device"](#). *The National Capital Area Skeptics*. Retrieved 12 January 2008.
2. *Newman v. Quigg*, [877 F.2d 1575 88-1312](#) (US Court of Appeals, Federal Circuit 5 July 1989).
3. *Peterson, Ivars* (5 July 1986). ["NBS report short-circuits energy machine - National Bureau of Standards"](#). *Science News*. Retrieved 25 March 2019.

In this section you will experience a slight detour. Yet it is worthwhile understanding the perpetrators of the ‘credible science’ written by NBS, that has kept Newman’s machine and possible advancements in energy science suppressed.

NBS who are now known as National Institute of Standards and Technology (NIST, name change in 1988 [51]) are now under investigation for malfeasance by approximately 3400

architects and engineers known as the ‘Justice Rising for 9/11 truth’ [52]. This movement was founded by Richard Gage AIA in 2006. These architects and engineers are demanding further details on how NIST came to their conclusions on how Building 7 and the Twin Towers collapsed on that fateful day September 11th, 2001, when nearly 3000 people lost their lives. NIST are currently withholding information contrary to their own rules of disclosure. NIST’s official reports on how these buildings collapsed do not match with the \$300,000 PhD studies carried out by Alaska Fairbanks University [53] whilst NIST had a budget of 6 million dollars.

<http://ine.uaf.edu/wtc7>

The ae911Truth movement and its fellow requesters are now going ahead to file suit against NIST for noncompliance with their own Data Quality Act (September 2021). The aim is to bring the perpetrators of this crime to justice and to direct the responsible NIST personnel to develop a new “Probable Collapse Sequence” that is consistent with Alaska Fairbanks University PhD studies, factual physics, and the further evidence of explosions reported by eyewitnesses, along with thermate detonation material found in the rubble of the destroyed buildings.

Links to case:

[9/11 Families and Experts Submit New Eyewitness Evidence of Explosions in Building \(ae911truth.org\)](http://ae911truth.org)

[NIST-WTC7-Request-for-Correction-Supplement-12-07-20-public updated-1-08-21.pdf \(wtc7report.org\)](http://wtc7report.org)

end of detour

POINT NO.1

"Report of Tests on Joseph Newman's Device".

The test by NBS on Newman’s Generator 15 years previous to 9/11, is available for everyone to analyse. [54]

NBS Test on Newman Generator

<https://files.ncas.org/nbsreport/index.html>

In this NBS test report, NBS state they measured the energy spent from Newman’s machine, through a set of resistors (see Dr Hastings comments, figure 9), NBS did not measure the energy generated directly from the discharge of the coil of copper which is where any excess energy gain would be stored in the electric field of the machine. The Newman Generator must be set within certain parameters and should **NOT BE GROUNDED TO EARTH**, there is *no ground* on the battery side of the Newman generator in Newman’s design, as can be disseminated in his book. This adding of a *ground earth* invalidates the NBS test as ‘credible science’ as they actually altered the design of the machine they tested and presented their findings as evidence in the court case, and in so doing, committed fraud. The machine they tested had an altered design to the very machine Newman was attempting to patent. **Grounding** provides a path of

least resistance and low pressure for current to follow. By placing a *ground earth* on the battery side of the machine will make this part of the circuit act as a '*super conductor to ground*' when the machine is on the blank spot, and discharge part of the timing sequence. References for why we have *ground earth* could be endless and I will include one here [55]. A google search will give you enough to understand this very simple understanding of *ground earth* and its uses in electricity. A '*ground*' is usually idealized as an infinite sink for charge, which can absorb an unlimited amount of current without changing its potential. Having a *ground earth* connected was never part of the Newman Generator design for obvious reasons. What this tells us about the NBS test is that there are two pathways for discharge due to NBS **adding** a '*Ground Earth*' to the design of the machine. As is well established, current will take the path of least resistance as-well as multiple paths if available. This means the current from the coils electric field can travel in two directions for discharge. NBS never measured any discharge on the battery side of the generator though the ground path during discharge.

Even if one excused this act of sabotage, which in the realms of the pursuit of truth through science is impossible, we could look at other parts of the NBS test to see if they analysed the altered design truthfully. They state that they would not measure what they classed as destructive power. NBS state:

'Because one side of the coil was nearly always connected to ground, significant current would flow only through the 200,000-ohm resistor which was connected to the side of the coil which was not connected to ground'.

When one examines what '*nearly always connected to ground*' in the NBS test means, we find that the coil is connected to the battery side of the machine 50 % of the timing sequence (page 61 of The Energy Machine). A very inaccurate statement by NBS and nowhere near being a scientifically accurate statement, in fact, this is NOT CREDIBLE SCIENCE, more like fraudulent science. The 'blank spot' of the commutator sequence is 30% of the timing sequence, the discharge is 20% of the timing sequence. NBS also state that the tape used to operate the timing sequence would be damaged due to large EMF discharge, and the efficiency they measured depended on the 'newness' of this tape. Newman stated to NBS that his invention should not be *grounded*. Video footage of this can be seen in the documentary film made by Jon Fox Films in 2015 [56].

By adding a *ground earth* to the machine, NBS CHANGED THE DESIGN OF THE MACHINE and hence deceived the District Court and failed in their attempt to correctly measure output energy for the patent award. This is an obvious conclusion, as a '*ground earth*' was never in the design of the machine. This was pointed out by Dr Hastings at the time. This is why Dr Hastings made the comments he did! This information can be seen in Newman's book on page 321 (page 328 of reference link to Newman's book). Newman claimed that the National Bureau of Standards test was an attempt to discredit him and stop him obtaining a patent, which it did in 1989.

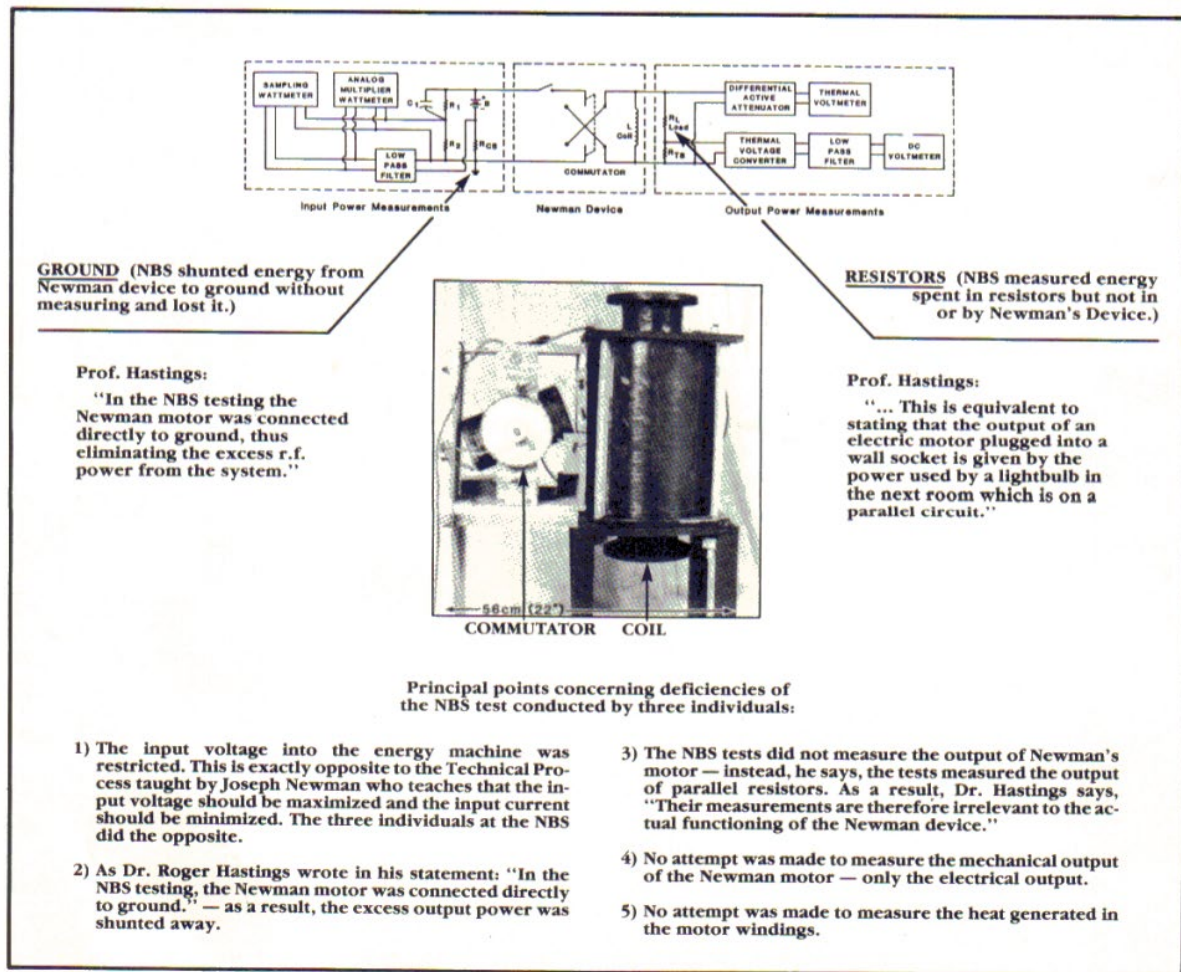


Figure 9: Dr Hastings comments on NBS test illustrated in Newman's book, page 321 of 'The Energy Machine'.

POINT NO 2

, 877 F.2d 1575 88-1312

[Newman v. Quigg, 877 F. 2d 1575 - Court of Appeals, Federal Circuit 1989 - Google Scholar](#)

The above link takes you to the discussion of the court case with the patent office.

NB: Newman clearly states in the appeal case that his generator design had been changed by NBS, by them adding a *ground earth* to the machine. Here is a short extract from the minutes of the case:

"Mr. Newman argues that the NBS evaluation was fatally defective because all tests were conducted with the device grounded. He states that it is essential that his device not be grounded during operation. He points to two reports from Mississippi State University which were provided to NBS; one report showed efficiencies below 100% when the device was grounded, and the other contained comments by one of the Mississippi State engineers that

efficiencies greater than 100% appeared to be obtained when the device was not grounded. It is undisputed that NBS had copies of these reports prior to designing its tests. Mr. Newman argues that had NBS sought to duplicate or verify any of these test results reported by others, NBS would have discovered its errors. Newman argues that NBS should have done this in order to confirm or deny his claims”.

There are some interesting comments made by the Special taskmaster that are now very poignant due to the observations made in my experiments.

Quote from report:

The master reported that the results shown for the Newman device appear to conflict with the laws of thermodynamics and expressed scepticism concerning Mr. Newman's theory of gyroscopic energy and the conversion of mass to energy. The master stated that " there is no evidence corroborating Newman's scientific theory". However, the master also found that the " evidence before the [PTO] and [the district court] is overwhelming that Newman has built and tested a prototype of his invention in which the output energy exceeds the external input energy; there is no contradictory factual evidence". The master concluded that even though the operation of Plaintiff's system seems contrary to recognized scientific principles, Plaintiff has demonstrated the operation of his system by very clear evidence and is therefore entitled to a patent if he otherwise satisfies the requirements of the Patent Statute (35 USC)

The master says the machine is in conflict with the laws of thermodynamics, yet little did he know at this time that Newman’s generator was operating in and benefiting from the Endothermic Electric Effect due to his clever design, and his machine did not violate the laws of thermodynamics. The Newman generator follows the laws of thermodynamics, and this is completely understood due to the laws of thermodynamics written by Boltzmann and Planck. Newman’s machine confirms these laws and uses time as a defining parameter to benefit from the 2nd law of thermodynamics. The ideal gas law is demonstrated in chapter 4 as an integral part of understanding the Endothermic Electric Effect of an electric field charge.

Science does not have a shelf life and although Newman might have made mistakes in how he dealt with his patent application, the facts remain:

1. The scientific facts contained within this work refute the NBS test as ‘credible science’, their test report was a deliberate act of sabotage and deceit.
2. The adjudication by the court that refused Newman a patent is not confirmation that Newman’s machine did not do as he claimed. The court ignored the fact NBS had changed the design when testing the machine, this in itself is collusion considering the evidence.

Science was yet to define the ‘Endothermic Electric Effect’ during the joules charge of an electric field in the year 1989 although it is interesting to note that no-one mentioned Maxwell’s displacement current. This being the very essence of the energy gain Newman’s machine produced, and it was unknown or not analysed correctly how the physics related to the machine at this time. This is why the Special Taskmaster reported as he did, The Special Taskmaster

said Newman should be granted a patent for his machine, and who was then subsequently ignored by the court that had actually instructed him to do the report:

" There is no evidence corroborating Newman's scientific theory".

"Plaintiff has demonstrated the operation of his system by very clear evidence and is therefore entitled to a patent if he otherwise satisfies the requirements of the Patent Statute (35 USC)"

However, now there is evidence of an Endothermic Electric Effect, as confirmed by the research work contained here within.

Donald Quigg, the commissioner for the patent office and the defendant in the case states in the movie by Fox, and I quote:

"If you're going to reverse the laws of physics, you better have some data to back it up."

To correct him, no laws of physics have been reversed, and within this work the data shows (figures 10,27,35) how Newman's machine obeys the laws of physics, it was just not understood how the laws of physics applied to electricity being endothermic, and in regard to this machine using this endothermic charge with respect to time, to obtain over 100% efficiency.

POINT NO 3

"NBS report short-circuits energy machine - National Bureau of Standards".

[NBS report short-circuits energy machine. - Free Online Library \(thefreelibrary.com\)](http://thefreelibrary.com)

Point no. 3 is a news article about Newman's court case with the patent office. This is just irrelevant.

3.2.1.1 Conclusions

According to scientific history there is no such thing as a design for an endothermic electricity generator, and the fact that it produces more energy on the output than is imputed has never been further investigated other than by Newman and Naudin. Every generator produced to create electricity in recorded history, have been exothermic energy generators.

How Newman's Machine Obeys the Laws of Physics

1. The Newman generator has a minimal catalyst current applied to induce the photoelectric effect, see (5) and (6). A minimal catalyst current is used because of the density and conductivity of the copper. If too much current is applied, it will fill the negative part of the electric field very quickly and the time dependant energy gain reaction will be lost. Newman taught that when the catalyst current completed the circuit, the reaction would change from energy gain to energy loss, or in other words, endothermic to exothermic.

2. A high voltage can be applied due to the density of the copper. This large pressure of voltage and catalyst current is the EMF applied, which will result in causing maximum ionisation that induces (5) (6) the Endothermic Electric Effect. As-well as this, the electric field gains a maximum number of electrons from the copper due to the ionisation of the atoms, and these electrons are released into the negative current field as in agreement with the photoelectric effect equation by Albert Einstein (5). The reaction causes electrons to be attracted from the environmental heat energy surroundings.
3. Surface area is important as it allows for maximum amount of ionisation from the copper during the time dependant reaction to benefit from the 'Endothermic Electric Effect'. This is because the initial ionisation is at the surface due to the EMF impact from the outside of the wire to the atoms.
4. The permanent magnet increases the energy gain with its EMF causing more continual ionisation in the copper coil.
5. The timing: - start charge - stop charge -and discharge is crucial, this is due to the change from power gain to power loss, endothermic to exothermic, and if not calibrated correctly, it will not capture the Endothermic Electric Effect energy gain.

4 NASA Experiment

In 2007, NASA [57,58] designed an experiment that would plot the charge of an electric field. We can now decipher the characteristics of an electric field charge, and how this can impact future energy generator designs, including endothermic energy generators.

In this study NASA state:

“During the cycle testing, the cell exhibited an endothermic cooling in the initial part of the charge cycle. The discharge portion of the cycle is exothermic during the entire discharge period. The presence of an endothermic reaction indicates a significant entropy effect during the beginning of charge cycle. Further studies will be performed to understand the thermal characteristics of the Li-ion cells at the different operating conditions.”

Full NASA experiment can be viewed here.

<https://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/20070032054.pdf>

National Aeronautics and Space Administration

Effect of charging and discharging on thermal stability of Panasonic 18650 Li ion cell

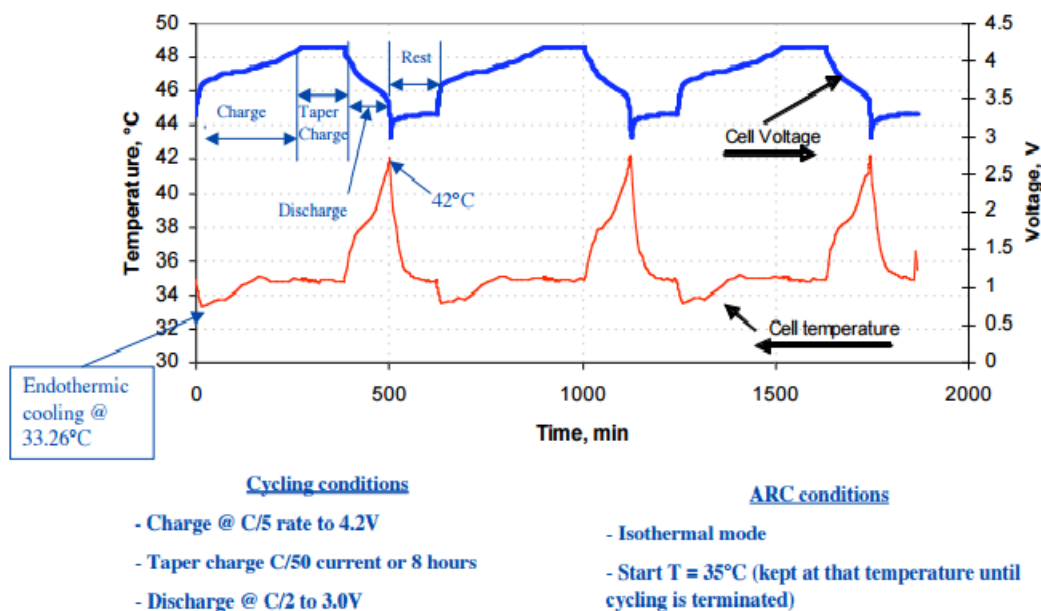
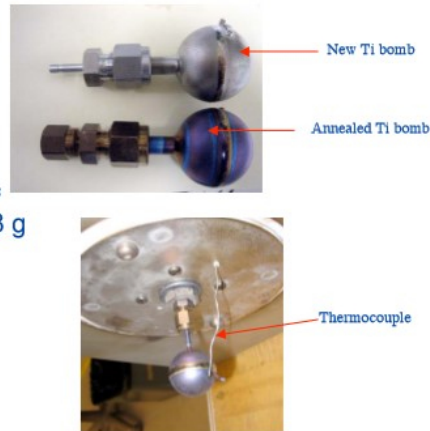


Figure 10: NASA Graph: NASA charge and discharge the Electric Field of a lithium battery. They repeat the experiment 3 times for continuity of data results and the symmetrical look on the graph proves the accuracy of their data collection methods. The main charge which is under discussion is the first 250 minutes of the charging cycle.



Thermal Stability of Li ion components

- Materials studied so far:
 - Electrolyte:
 - 1M LiPF₆ in 1:1 EC:DMC
- Instrument Used:
 - ARC = adiabatic calorimeter
 - Test sample holder material = Titanium, 0.8 mm wall diam, 8 g
 - Thermocouple = to measure variation in temperature.



Sample bomb suspended from the top of the ARC.

Figure 11: NASA ARC: The battery is placed in a Titanium bomb (Ti) within the adiabatic calorimeter arc. Calorimetry is when no heat is exchanged with the surroundings. Therefore, the Arc is a separate thermal system to the outside environment. This allows you to accurately measure the temperature of the volume of gas around the battery which is housed in the Ti bomb that is suspended within the Arc as seen.

There is an Endothermic Electric Effect event at the beginning of the charge cycle, starting temperature is 35⁰C and reducing to 33.26⁰C. This reaction also occurs further into the charge cycle at approximately 200 minutes (this is discussed in USW experiment chapter 9). The Endothermic Electric Effect reaction happens every time the EMF is engaged as shown in figure 10 NASA graph. This is recognised as an 'endothermic cooling' by NASA.

Due to the design of this experiment, the ideal gas laws can be applied to the NASA experiment [59,60] and used as a proof of the Endothermic Electric Effect reaction.

Using **Boltzmann's constant**, usually given the symbol '*k*'.

$$k = R/N = 1.381 \times 10^{-23} \text{ J K}^{-1} \text{ molecule}^{-1}$$

This means that we can also write the ideal gas equation as

$$PV = nRT = nNkT$$

Because the number of molecules in the sample, N, is N = nN we have

$$PV = Nk_B T \quad (1)$$

where P is the pressure of a gas,

V is its volume,

n is the number of moles of the gas,

R is a constant called the ideal gas constant or the universal gas constant.

T is its temperature on the kelvin scale,

k_B = Boltzmann Constant

N_A = Avogadro number

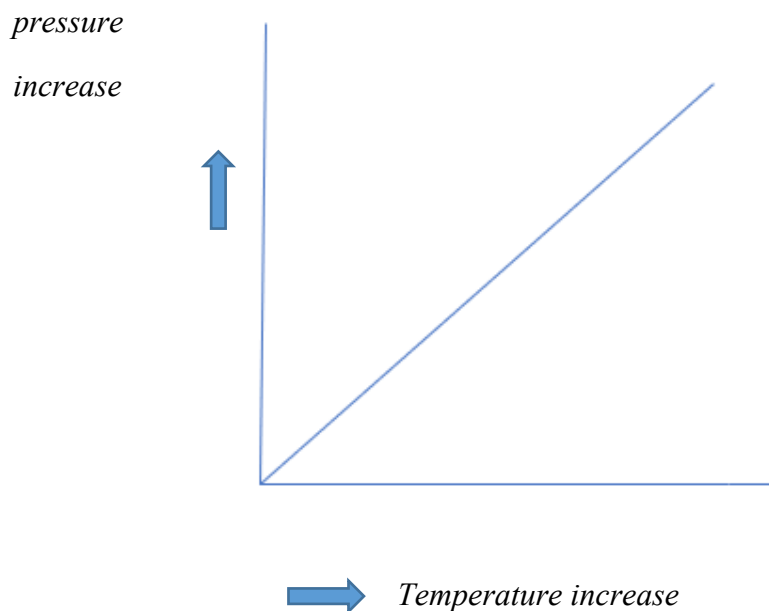


Figure 12: Today's physics understanding and linear relationship for Pressure and Temperature.

Important Note: The electric field of the battery is a separate entity to the air within the T_i bomb. This is an important observation to appreciate otherwise the relationship of pressure and temperature shown in figure 12 would not make scientific sense. There is attraction of electrons to the ionised lithium, the lithium ions. The negative part of the electric field will expand to a certain size depending on the amount of ionisation of the lithium atoms. The magnetic field polarises itself around the electric field. There is an exchange of heat from the volume of gas within the T_i bomb, from the magnetic field to the electric field of the battery.

Applying 'Guy Lussac's Law' or also known as 'Amontons Law'; which was later defined by Boltzmann and Planck's physics energy equation that states:

A pressure of a fixed mass of gas held at a constant volume is directly proportional to its kelvin temperature.

There is a fixed volume of gas in the T_i Bomb. Temperature is the measurement of heat present and represents the internal energy contained within this volume of gas surrounding the battery which is contained within the T_i Bomb.

Applying equation 1: an equation to the reaction is derived during the endothermic cooling time period. One can rearrange for P, with T starting temperature (T_s) minus the temperature drop of reaction (T_d) with respect to time:

Equation 2

Applying equation 2 will give a reduced pressure around the electric field during the endothermic time reaction, which is measured using a thermocouple on the outside of the T_i Bomb during the temperature decreasing time period within the T_i Bomb.

$$P = \frac{Nk(T_s - T_d)}{V} \quad (2)$$

This shows us that the direction of the higher energy state in the gases surrounding the system, flow to the electric field of the battery, a low-pressure area is measured around the electric field. There is a high pressure to a low-pressure flow of electrons in the open system exchange, obeying the 2nd law of thermodynamics and a proof of the mechanical process of energy in regard to an electric field charge and the 2nd law of thermodynamics. The temperature reduction within the T_i Bomb confirms this. As NASA state, '*there is a significant entropy effect*', in the charge of the electric field, and this is observed by measurement of the temperature change. There is a kinetic energy gain to the electric field of the battery from the surrounding volume of gas. In this case, it will be: *The total electrons ejected from the lithium atoms and the electrons gained from the gases of the environmental surroundings, which are attracted to the positive ions in the electric field, during the endothermic charge period.*

We can deduce that as the temperature of the system reduces in the first 15 minutes of the electric field charge, certain observations can be realised:

- There is a fixed mass within this volume of air within the T_i bomb.
- Pressure and temperature are reduced in the volume of gas within the T_i bomb which surrounds the electric field of the lithium battery.
- There are less collisions, entropy is reduced in the volume of gas, there is orderly attraction of electrons into the electric field not chaos, this is identified by observing an endothermic reaction, the temperature drop with respect to time.
- An increased charged surface area of lithium ions⁺ measured in voltage (pressure) is seen in the NASA graph figure 10 on the blue line.

Kinetic Energy

Kinetic energy is the energy that objects possess due to their motion.

$$KE = \frac{1}{2}mv^2$$

m = mass (kg)
 v = velocity (m/s)
 KE = Kinetic energy (J)

Figure 13: *Nonrelativistic Kinetic energy relationships within the volume of gases*

5 The Photoelectric Effect

When studying contemporary physics and the photoelectric effect, one cannot ignore an article by Stephen Klassen [61]. Klassen demonstrates the different teachings and concepts for understanding the photoelectric effect. Within my experimental work and NASA's work we know that 'photons of light' are not at play, as we are analysing the electric field charge using a DC power supply which supplies electrons to the system and not photons. Nevertheless, as a starting point, an equation to the ensuing reaction must be offered for understanding and teaching purposes.

These quotes are quite apt here:

"Whether one takes an instrumentalist or realist position, the interpretation of the photon is challenging; moreover, it is held by many that it is not necessary to have photons in order to explain the photoelectric effect successfully." (Strnad [1986](#); Milonni [1997](#)).

"Lenard and other physicists used existing theories of physics to devise good explanations for it. Basically, they reasoned that since the electrons are ejected immediately when the light hits and since they have energy which does not depend on the intensity of the light, their energy must originate inside the atom. All that the light does is trigger the release of the electrons. Since the structure of the atom was not known at the time, their explanation was quite reasonable although not very detailed."

The argument for the photoelectric effect being **only** a photon light reaction with a substance such as a metal, and not a generic idea which can be expanded to mean an EMF is something that is evident from a literature review on this subject. The interpretation presented to you in this work is simple; the photoelectric effect is the electromagnetic force that interacts with a material and causes an electric field to be initiated. The photoelectric effect equation presented in this work is interpreted based on experimental observation and is well defined in this work. An EMF is referred to as 'The photoelectric Effect'. The photoelectric effect produces an endothermic electric effect and is the basis to understanding the charge of an electric field and is definitely not irrelevant as the 1st supervisory team stated. Understanding what this reaction does is the basis of understanding this work.

The observed photoelectric effect reaction by Lenard is parameter based.

- $h\nu$ (Planck's constant and frequency)
- Density of metal
- Surface area

$h\nu$, which has two components identified by Max Planck.

“On the basis of his work on this, Planck formulated a law, known as Planck’s radiation law, that describes the spectral energy distribution of the electromagnetic radiation emitted by a black body at a definite temperature. Planck also determined the value of the Boltzmann constant from this derivation.” [62]

‘Planck’s constant is a physical constant that is the quantum of electromagnetic action, which relates the energy carried by a photon (or electrically charged particle) to its frequency. The photon or particle of energy is equal to its frequency multiplied by the Planck constant. The Planck constant is of fundamental importance in quantum mechanics, and in metrology it is the basis for the definition of the ‘kilogram’. The Planck constant is defined to have the exact value:

$$h=6.62607015 \times 10^{-34} \text{ J}\cdot\text{s} \text{ (3) [Wikipedia]}$$

The first reaction seen in the Earth’s thermosphere is caused by The Photoelectric Effect

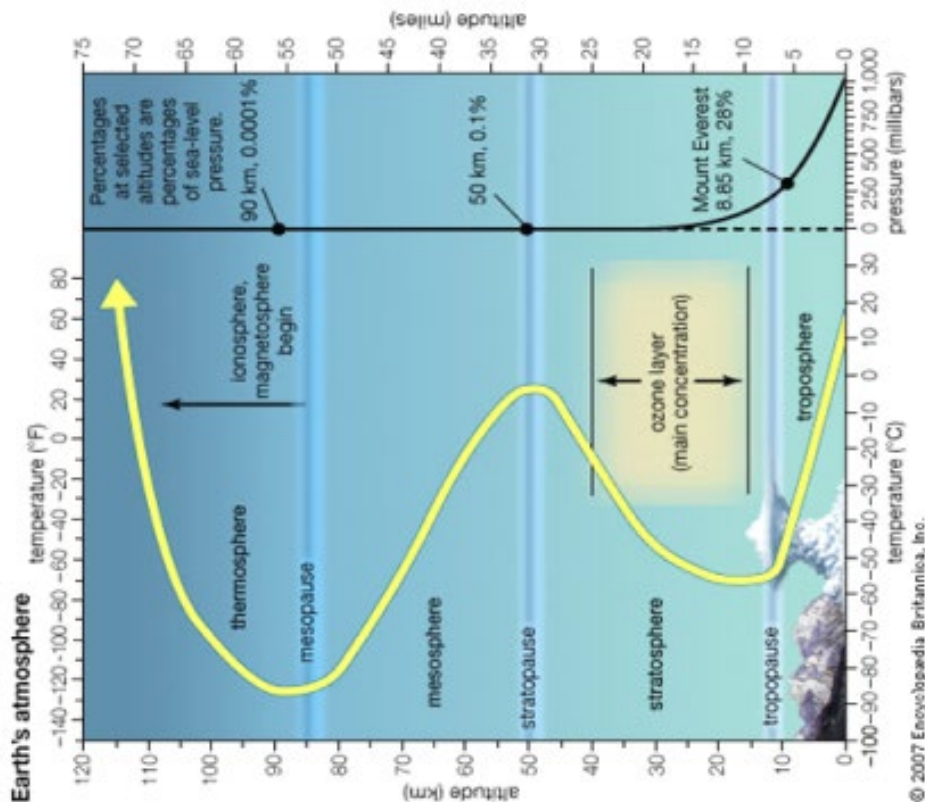


Figure 14: Earth’s atmosphere undertakes several charge states. The first reaction seen in the thermosphere is ‘The photoelectric Effect’ and is the catalyst to an ‘Endothermic Electric Effect’. This is the first reaction observed as the atmosphere pressure increases with heat energy from the top of the ionosphere to the ground. The reaction is first endothermic, then exothermic, it then becomes endothermic then exothermic again as seen. [63]

The pressure of the Earth's system increases in respect to sea level pressure the further from the top of the ionosphere to the Earth's surface. I have purposely placed figure 14 sideways. This is done so you can notice the similarity between the USW graph in chapter 9, the temperature curves during the charge of the lithium battery and the charge of the Earth's atmosphere are remarkably similar.

It was in 1887 that the Photoelectric Effect was first observed by German physicist Heinrich Hertz. The theory of the Photoelectric Effect was further developed during the years 1887-1905 by Wilhelm Hallwachs and Philipp Lenard. Lenard investigated the phenomenon of the photoelectric emission in detail and devised the experiment shown below in figure 15 [64].

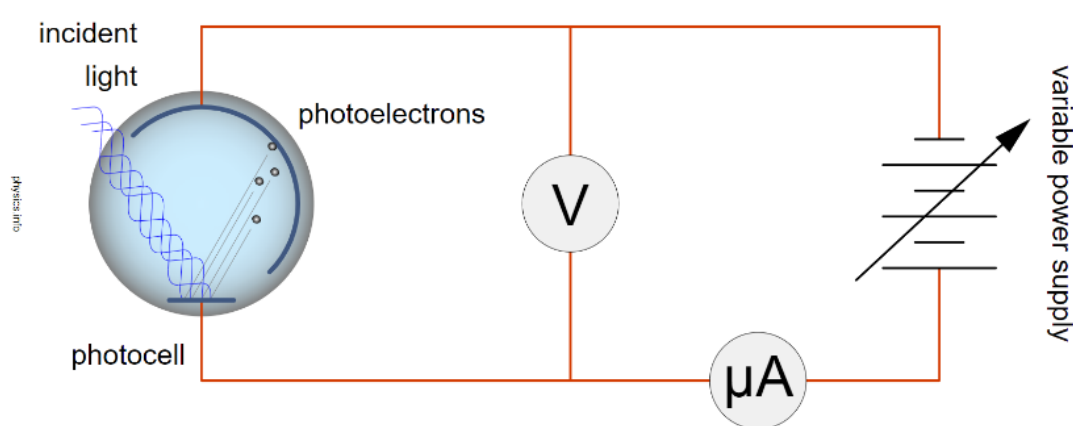


Figure 15: *Experiment devised by Philipp Lenard, Nobel prize winner 1905. Schematic of experiment to show and measure the photoelectric effect.*

In Lenard's experiment, the power incident light is used to adjust the frequency of the photon flow (electrically charged particles), or the EMF applied. A variable voltage power supply is used to demonstrate that it is the increasing frequency of the EMF that induces an increasing current flow (current being a flow of electrons) reaction from the photocell as seen. There is a separation of electrons from the atoms of the metal of the photocell, making positive ions and kinetic electrons. Lenard found the greater the frequency (or velocity) of the EMF applied, would result in a greater frequency of electrons measured by the negative ammeter. He also deduced that the flow of electrons could be decreased by increasing a negative voltage on the photocell by using the variable resistor power supply as seen in figure 15. By increasing the variable resistor power supply's negative voltage, would reduce the flow of electrons that were measured by the ammeter, due to the negative repulsion force being increased towards the photocell. Lenard's conclusions in this experiment were, that force, using the frequency of light, had a linear relationship in the flow of electrons to the ammeter.

There was no observation made by Lenard to see the 'Endothermic Electric Effect' reaction, which is caused by the emission of an electron from the atom. At this time, they were simply trying to grasp the idea of frequency and force to the reaction. Another very important point the Lenard experiment did not focus on is that to have any current flow you are actually creating

a charging electric field of positive and negative constituents, rather than, just a linear flow of current to the anode collector plate.

Why is an Electromagnetic Force required to initiate an Electric Field Charge?

Force was first introduced in the modern era by Issac Newton in his famous book, '*Principia Mathematica*.' [65]

"The law of universal gravitation, which he also confirmed from such further phenomena as the orbits of comets, states that every particle of matter in the universe attracts every other particle with a force that is proportional to the product of their masses and inversely proportional to the square of the distance between their centres."

Force = mass x acceleration

The Coulomb's law equation [66]

Coulombs law provides an accurate description of the force between two objects whenever the objects act as electric charges. There is no explanation of how and why they interact.

There are four variables, K, R, Q⁺ and q⁻.

$$F = K (Q^+ \times q^-) / R \text{ (4)}$$

'F' represents the force generated between the two charges

'K' is the Coulomb Constant which is equal to $8.99 \times 10^9 \text{ N m}^2 \text{ C}^{-2}$ in air.

Q⁺ and q⁻ represent magnitude of charges

'R' is the distance between the two charges

Since Coulomb's law applies to electric charges, the distance R in the equation is the distance between the centres of charge for both objects (not the distance between their nearest *surfaces*).

Q⁺, is generally in electricity thought of and measured as: the charged ⁺ion sphere and interacts with q⁻ due to attraction. The ion sphere has a positive charge from the centre of the ionised atom and all q⁻ charges are located from Q⁺ at a distance R.

Examples of force

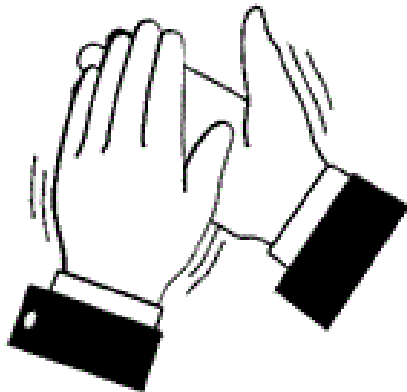


Figure 16: *A hand clap - the sound wave produced by the hand clap is the result of the two objects or two operators, in this case two hands colliding.*

The sound wave produced, is proof of the ‘need’ for two objects to produce *force*. Hence for an electric field charge to exist, there must be ‘two operators’ or ‘two objects’ interacting. The first action of the two objects interacting is the catalyst to the next two objects which produce a charging electric field.

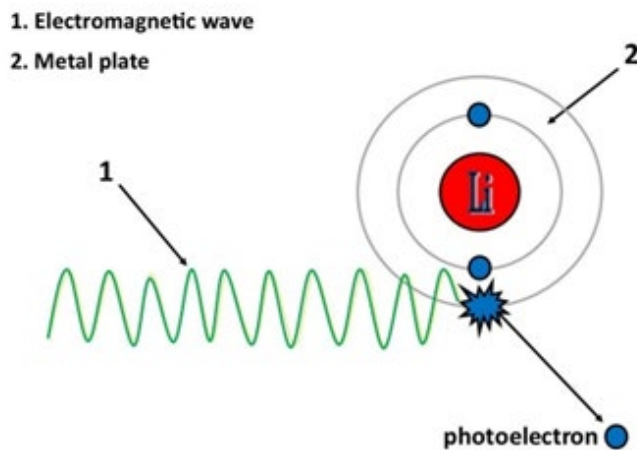


Figure 16a: *Photoelectric Effect example.*

The 2 objects of force in this example are,

1. Electromagnetic wave
2. Metal plate

It was Albert Einstein who was awarded the Nobel Prize for Physics in 1921 for ‘The Photoelectric Effect’. The honour was stated to be “for his services to ‘Theoretical Physics’, and especially for his discovery of the law of The Photoelectric Effect.” [67,68]

Einstein based his theory of the Photoelectric Effect as an incident electromagnetic energy being absorbed as a corpuscle of energy ‘ $h\nu$ ’ by the atoms in the metal plate.

h = Planck’s Constant

ν = Frequency

As a result, a part of the energy goes to the ‘work function’, ϕ ion⁺, the metal lattice, and part of the energy goes to the ejected electron in the form of ‘kinetic energy’(K.E.)

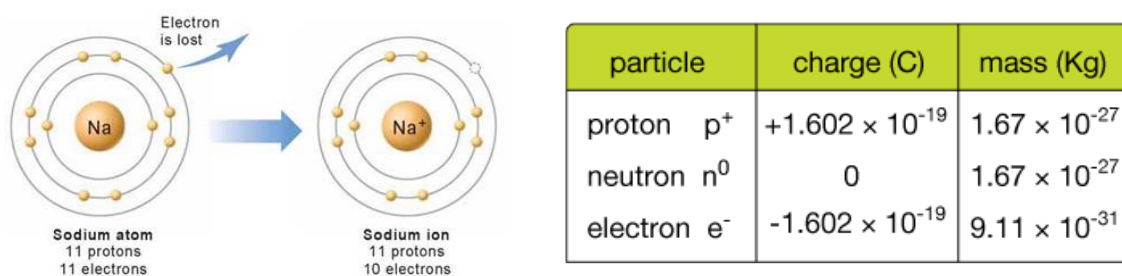


Figure 17and 17a: *You will notice the sodium atom loses an electron.*

In a charging electric field, the electron is not lost as described in figure 17, but removed to the negative part of the electric field. Energy is transferred to the atom and the electron, the EMF impact causes the metal atom to ionise to, an increased kinetic ion⁺ and an increased kinetic electron: *the opposite charge to each other, and due to this relationship, we have two electric monopoles of attraction and repulsion, this is the fundamental basis for electric fields and electromagnetism.* The energy applied has altered the state of the atoms and has not been diminished, and is obeying the ‘Conservation of Energy Law’. It is the catalyst to the reaction within the atom. Einstein expressed this as:

$$E_{\text{photon}} = \phi_{\text{ion}} + KE_{\text{electron}}$$

$$h\nu = \text{ion}^+ + e^- \quad (5)$$

Taking this logic and theory:

An EMF placed into the electric field charge of a lithium battery as seen in the NASA, USW, Swansea experiments and home experiments (which is photon based (home experiments) as well as EMF based); we can write this equation:

$$\text{Force} = \text{Li}^+ + e^- \quad (6)$$

Li⁺ = positively charged lithium atom ion

e⁻ = negatively charged lithium electron

Force = applied EMF

6 High Voltage Transmission Line Evidence of Endothermic Electric Effect

This observation by national grid might seem trivial yet in looking for a literature review on a reaction in an electric field charge that has not been identified before except as an ‘endothermic cooling’ by NASA, and ‘cooling effect’ by Naudin, is worth reporting. This observation by national grid observes the reaction.

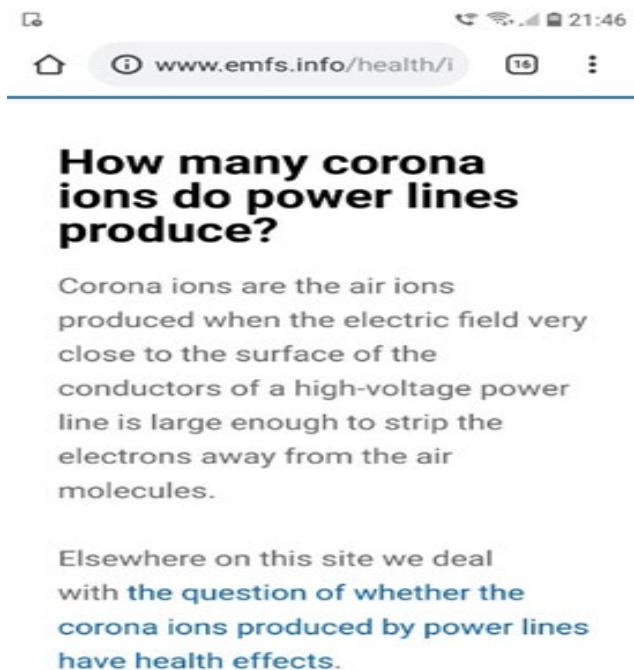


Figure 18: *This is a description by national grid taken from their website. I have since found this information difficult to find but screenshot this figure when I came across it.*

Opposites attract to the conductor ions⁺. The state of a chaotic electric field around the conductors known as an ‘envelope of corona’, exists as an exothermic reaction. Air ions can be produced when the system is an endothermic state and an exothermic state as far as I am aware due to evidence of rising pressure, figure 14. The reaction is observed by national grid although the description is incorrect.

References supplied by National Grid. [69]

7 Townsend Collision Theory

It was John Sealy Townsend [70] who first wrote the theory of the ionisation of gas by collision.

In a study of High Voltage Fundamentals by Kuffel et al 2000 [71], Kuffel produced Figure 19 from Townsend's work, and states on page 296 of his work:

“Townsend found that the current at first increased proportionately with the applied voltage and then remained nearly constant at a value I_0 which corresponded to the background current (saturation current), or if the cathode was irradiated with a u.v. light, i_0 gave the emitted photocurrent. At still higher voltage the current increased above the value i_0 at an exponential rate. The general pattern of the current–voltage relationship is shown schematically in figure 19. The increase in current beyond V_2 Townsend ascribed to ionization of the gas by electron collision. As the field increases, electrons leaving the cathode are accelerated more and more between collisions until they gain enough energy to cause ionization on collision with gas molecules or atoms.”

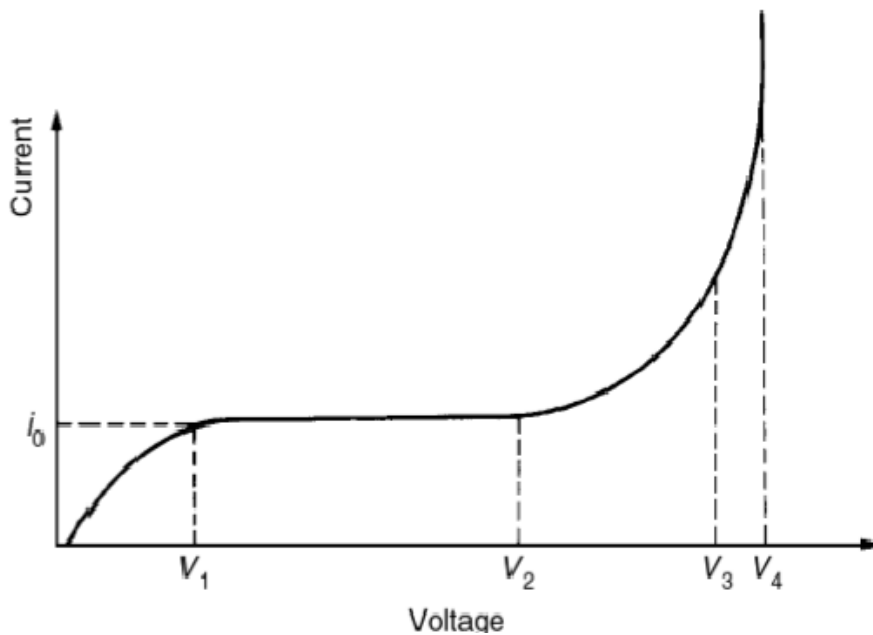


Figure 19: Kuffel graph: Townsend's current-voltage relationship in pre spark region.

The variation in the gas current is measured by increasing the EMF on the two parallel plate electrodes as seen in Kuffel's figure 19. The pre spark region is the growth of an electric field with respect to time around a 3-dimensional conductor before a discharge either to a load or to another conductor's electric field that is in close proximity, and this is due to an attraction force.

Townsend's theory is explained as - the increasing gas current is due to a chaotic collision of electrons with atoms and molecules, which in turn release more electrons from the gas molecules and become part of the current stream travelling to the collector, the anode electrode.

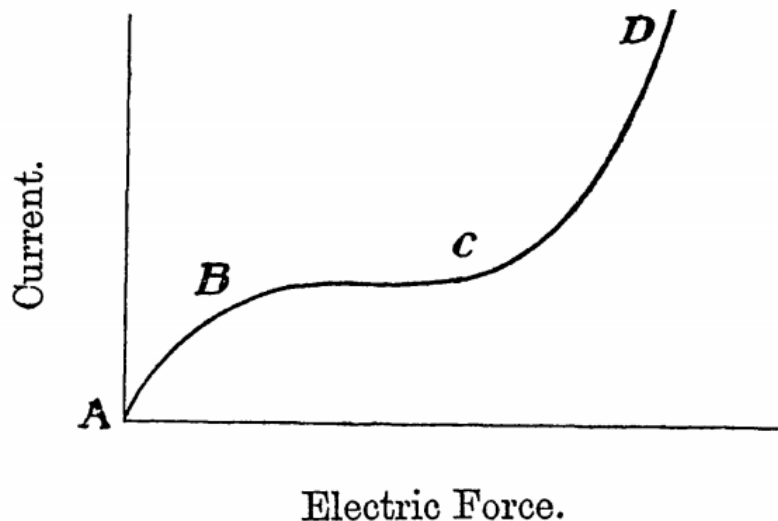


Figure 20: Townsend's original graph of current increase to electric force

Townsend concludes for between BC page 2 of [70]:

"In the Second stage, BC, the current remains practically constant and shows only small variations for large changes in the force. In this case, if the force is too small, some of the ions do not reach the positive electrode but diffuse through the gas to the negative electrode."

Townsend is stating that the gas collisions in this region of electromotive force BC, is of not enough collision force within the gases to continue as a curved linear increase like AB. It is only when an increasing electromotive force between CD does the current continue to be more like AB. The relationship between voltage, current and gas collision current between AB, is a mostly curved linear reaction at first, as seen. Yet why would the current change from a curved linear reaction as in AB? to an almost flat linear reaction as seen in BC? Considering there is an increasing linear EMF being applied with respect to time? Kuffel states that the current has reached saturation between BC, suggesting a resistive state and chaos. Why would the current from the volume of gas for the reaction between BC not remain a curved linear reaction as in AB? The curved linear reaction is not the same between plotted areas AB and BC, as can be seen. This suggests there must be a different explanation compared to the explanation offered by Townsend. Townsend's theory is still regarded as the correct definition of current and voltage reaction relationship within an electric field charge in high voltage fundamentals, has quoted by Kuffel.

Question: Why does the gas collision ionization theory for current between BC with an increasing EMF, not behave the same as in AB and CD in figures 19 and 20?

Answer: A slowdown of ionisation has occurred in the anode, which is the driver to the process, and this reaction is not due to collision of electrons with air molecules. The electric field reaction has changed from endothermic to exothermic, orderly attraction to disorderly chaotic attraction is now at play in BC due to less ionisation in anode. This can be recognised from the NASA figure 10 and USW figure 27 graphs.

Conclusion

Townsend's description of collision theory is not a correct explanation for how the electric field charge changes state. First it is an orderly endothermic electric field charge then a chaotic exothermic charge. This is due to the amount of ionisation in the anode part of the system, or one can say, the number of cations produced within the material of the system. This is why we see a change in the plotted curved linear graph to an almost flat line linear response in BC to increasing or continuous EMF. A very important observation is:

An electric field charge changes from orderly to disorderly with respect to time.

8 Tuneable Endothermic Plateau at High Temperatures

A study by Chih-Chung Lai et al / Nano Energy 25 (2016) pages 218–224 [72], showed how a tuneable endothermic plateau can enhance energy storage efficiency up to 21% at specific identified temperatures using binary metal alloys. This increase in efficiency being due to endothermic plateaus at certain temperatures. By applying increasing temperature there is ionisation of the metal and this ionisation being the catalyst to an endothermic plateau. This is demonstrated by the differential scanning calorimeter figures of relative heat capacity to temperature results obtained by Chih.

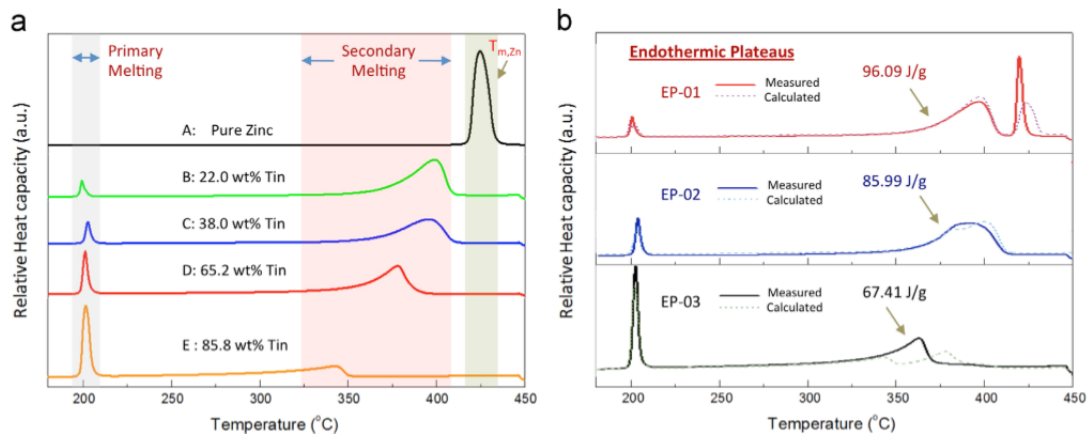


Fig. 3. Tunable endothermic plateaus of $\text{Sn}_x\text{Zn}_{1-x}$ alloy particle mixtures. (a) Melting behaviors of pure Sn and alloy particles with different Sn weight percentages (i.e., Sample A–Sample E in Table 1). (b) Measured (solid line) and calculated (dash line) heat capacity profiles for three $\text{Sn}_x\text{Zn}_{1-x}$ alloy particle mixtures denoted as EP-01, EP-02 and EP-03, respectively, in Table 2.

Figure 21, Chih's fig 3a and b: shows how ionisation occurs in stages with endothermic plateaus. First there is a primary endothermic plateau at 200 degrees, and then secondary endothermic plateau between 325 to 450 degrees centigrade.

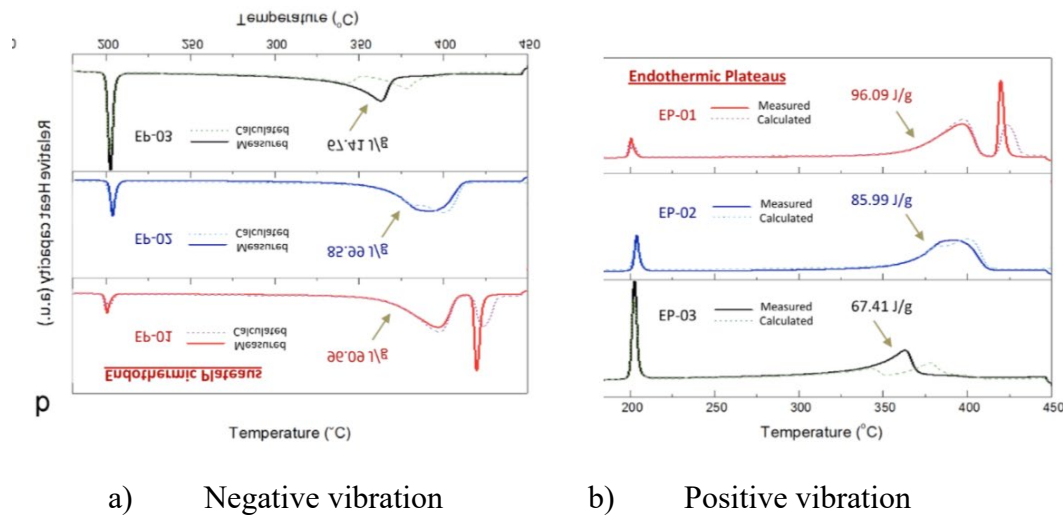


Figure 22: As seen in the previous example of Chih's fig 3b, the graph is copied and flipped 180 degrees to compare the behaviour in a symmetrical way, the ionisation curve to temperature of the electric field of the alloy is now presented with a positive and negative view. The relationship between the 2 components within the electric field can now be compared.

a) Chih states the secondary ionisation physical melt starts at 370°C and continues to 420°C, the graph shows 2 ionisation actions at this event, one being a spike. The first endothermic plateau at 400 and the spike plateau at 420 degrees.

By analysing in a symmetrical view, EP 01 is now seen as downwards in the flipped figure 22a, this representing the expanding negative field whilst temperature is increasing. The increase in temperature acts as the EMF and is the catalyst to the 2 ionisation plateaus in the alloy. This increasing temperature in Chih's experiment causes valence bands of the alloy electrons to be detached from the atoms binding attraction force of the nucleus. The electron volt force required to break these bonds has been initiated, and the removal of electrons starts a chain reaction.

b) The increasing number of positive atom ions of the metal alloy attract electrons from the surrounding environment, with a vibrational attractive force from the atom ions⁺ moving outward, dominating the local environment, and increasing the joules/gram energy of the alloy. There is an endothermic heat gain reaction into the electric field surrounding the alloy. This causes more ionisation due to frictional force and another endothermic plateau is seen on the graph as a relative heat capacity spike at 420°C.

In his conclusions, Chih states:

"This study opens up a new approach for creating a tuneable endothermic plateau by releasing the latent heat of binary metal alloy particles. An adjustable endothermic plateau can be applied to enhance the energy output of various systems at various working temperatures."

9 University of South Wales (USW) Experiment

Background on Battery Development



Figure 23: *Depiction of Sumerian tablet. Battery technology has been discovered to date back thousands of years, there are depictions of battery use recorded by the Sumerian civilization over 6 thousand years ago. [73]*

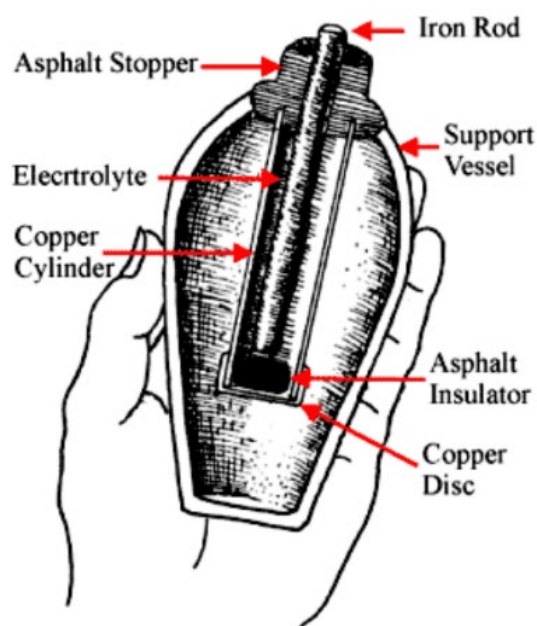


Figure 24: *The ancient battery in the Baghdad Museum, Known as the Baghdad Battery.[73]*

The lead-acid battery was invented in 1859 by French physicist [Gaston Planté](#) [74] and it has been the main battery technology for the recent past due to a large power to weight ratio. It also can be designed to have a high current output, ideal for automotive use. Today the lead acid battery is 80% recycle-able [75]. Industry developments of the electrochemical cell over time have been made by utilizing different metals, alternative materials for electrodes, and varying

chemical electrolytes for different applications, cost being an important driver. For example: Used for portable gaming machines; handheld devices; toys and power drills.

Cost/Wh/cycle life x1000=\$	Nickel-cadmium 6 cells	Nickel-metal-hydride 6 cells	Lead-acid small 6 cell pack	LI-ion pack with two 18650 cells	Lead-acid for wheelchairs and scooters
Capacity	600mAh	1000mAh	2000mAh	2000mAh	33Ah
Voltage	7.2V	7.2V	12V	7.2V	12V
Energy per discharge	4.3Wh	7.2Wh	24Wh	14.4Wh	396Wh
Cycle life (best cases)	1500	500	250	500	250
Battery cost (ref. only)	\$50	\$70	\$50	\$150	\$100
Cost per kWh (\$US)	\$7.75	\$19.50	\$8.50	\$20	\$1.00

Figure 25: Here is a selection of types of batteries that have been used over time. Showing some comparisons in parameters to cost for different materials. [76]

Development in battery technology is ongoing, with today's leader in battery technology being the lithium battery. The lithium battery has a good cycle life count, high energy density, high power and can be quickly charged. Possible advancements in the future will include lithium-air, lithium-sulphur, and sodium-ion.

Graphene could also replace graphite as a lithium-ion battery anode. Graphene is made of carbon atoms joined to form single or bi-layer atom-thickness. While graphite is essentially formed of multiple graphene sheets stacked on top of each other, the benefits of being able to stack individual sheets of graphene allows for easier and more efficient intercalation of lithium ions. Wang et al 2013, [77], explored carbon-based material, in the form of hemp fibre. The material was produced with a hydrothermal process [78] which Wang says is 1000 times easier to produce than a lithium system.

Wang states, "This novel precursor-synthesis route presents a great potential for facile large-scale production of high-performance carbons for a variety of diverse applications including energy storage".

USW Tests

Method

This set of experiments were performed in a purpose-built power systems laboratory at the University of South Wales. It is very interesting to see how the initial charge is an endothermic charge before becoming exothermic, and then becomes endothermic again when the voltage pressure increases. This means as the ionisation of the lithium proceeds, the states of charge change from first endothermic to exothermic, then back to endothermic and finally exothermic at the end of the charging procedure. These experiments confirm NASA results and agree with figure 10.

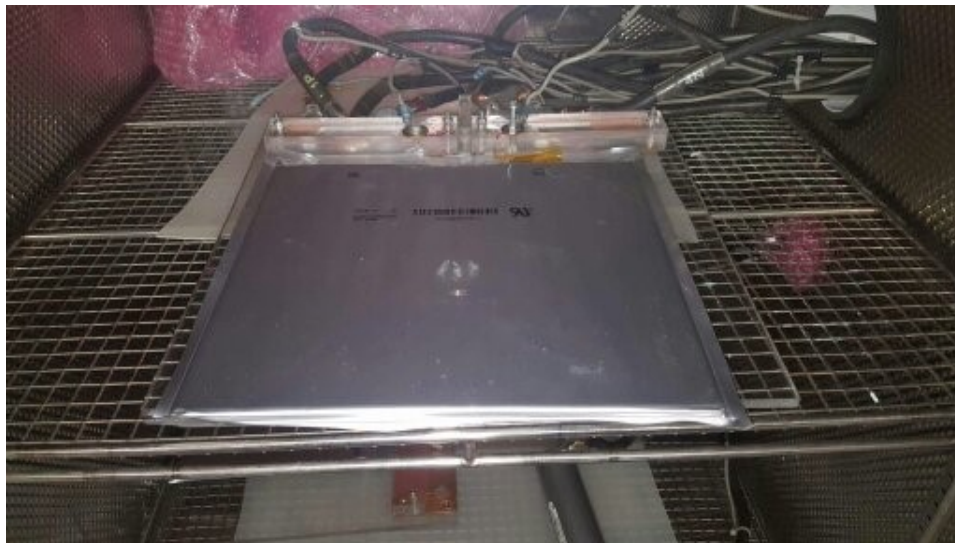


Figure 26: The A123 lithium battery was placed in a controlled chamber which had a controlled thermal temperature with a variant of 1 degree centigrade measured by the thermostat during the experiment. The temperature sensor monitoring the battery temperature is seen under the orange tape. The experiment was repeated 3 times, the battery had a different centigrade starting temperature measurement prior to re-charging each time.

Table 1: Starting temperature of battery charge.

<i>Relating to figure 27 USW graph</i>	Starting temperature of battery charges
Battery Charge 1 (blue line)	Battery Charge 1 = 26.8°C
Battery Charge 2 (green line)	Battery Charge 2 = 28.8°C
Battery Charge 3 (purple line)	Battery Charge 3 = 32.2°C

Table 2: *Charge settings*

Constant current = 9.15Amps per second	Approx. C/2 charge, half the capacity	Capacity = 18.3 amp Hour
Constant Voltage = 3.6V		Total charge time: 7500 seconds (125 Minutes)

Table 3: *Temperature, Ionisation, and state of charge to time.*

State of Charge (SOC)		10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Voltage ionisation		2.88	2.96	3.04	3.12	3.2	3.28	3.36	3.44	3.52	3.6
Temp °C	Charge 1	26.7	26.6	26.5	26.3	26	25.85	26.25	26.4	26.5	26.8
	Charge 2	28.8	28.7	28.5	28.2	28	27.4	27.5	27.3	27.4	27.6
	Charge 3	32	31.9	31.7	31.2	30.8	29.6	28.6	28	28.1	28.2
Time/sec		50	75	100	130	400	1400	3700	7200	7400	7500

Table 4: *Shows how long the Endothermic Electric Effect lasts before electric field becomes exothermic.*

1 st Endothermic cycle	State of Charge %	Time
Charge 1	65	2600
Charge 2	68	2800
Charge 3	80	7200

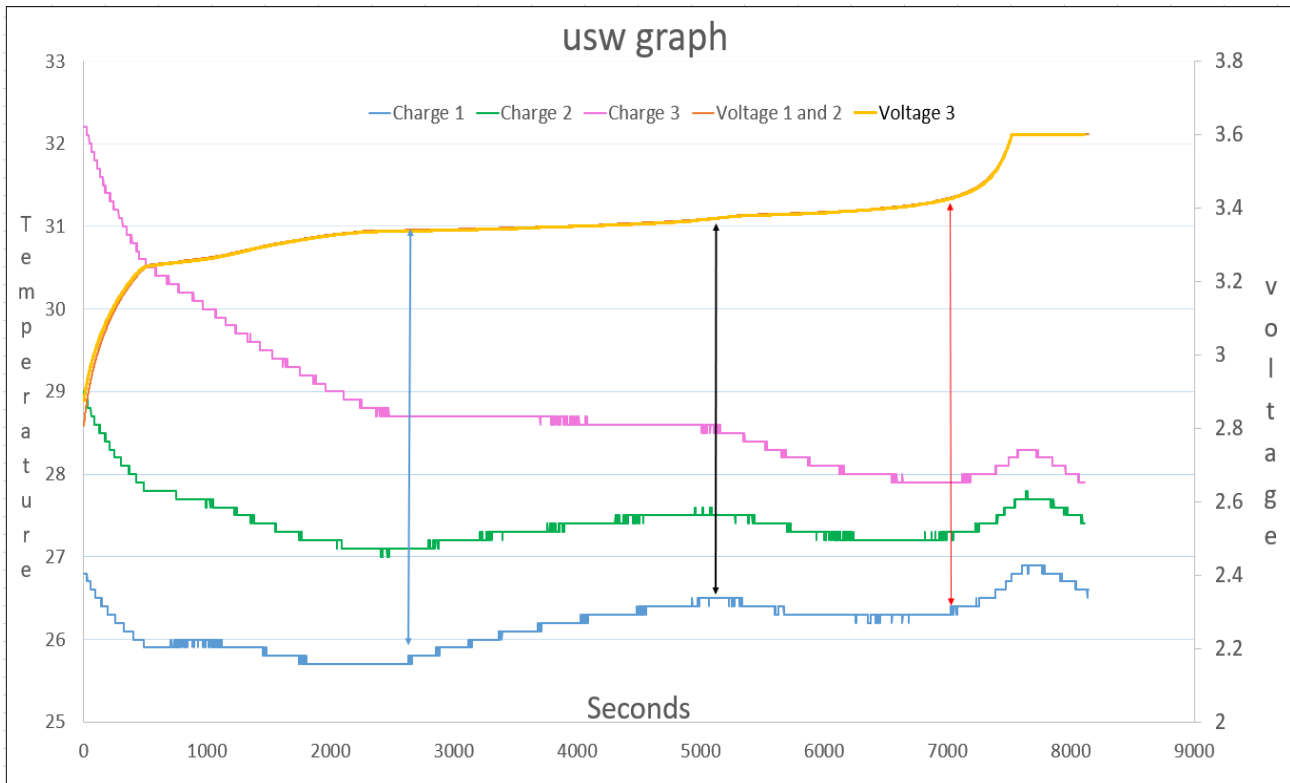


Figure 27: USW Graph: Battery temperature / time graph, voltage, ionisation, and electric field charge. There are 3 voltage lines, you see two voltage lines because of closeness of the voltage readings. (There was a rest period before battery was re-charged each time as described in the index 24.1, therefore graph was made as seen, without rest data.)

9.1 Observations and Experiment Conclusions

It can be seen from table 3, the higher the battery's thermal temperature is to start with, allows for a longer time period in the Endothermic Electric Effect before becoming exothermic. This is identified by a change from cooling to warming on the battery surface recorded by the temperature sensor. The length of time the charge is endothermic is due to the initial state of ionisation of the lithium atoms in the lithium plate, this is recognised by the difference in temperature of the three separate charges, table 1 and table 4. At the beginning of the battery charges, all 3 electric field temperature plots produce an endothermic curved linear reaction showing a temperature reduction on and around the outside of the battery. This is an indication of a heat energy gain from the air in the oven to the electric field. In this case, the temperature drop shows that an amount of heat energy has been removed from the surrounding volume of gas and has been attracted into the growing electric field of the battery in the form of electrons. It can be seen from table 3, how the 50% SOC is reached in 400 seconds, yet 100% SOC takes 7500 seconds.

The endothermic heat energy gain and hence temperature drop represents the negative electric field current gaining force in the form of electrons, and the electrons are attracted to the positive

lithium ions⁺. This attractive *force in*, towards the lithium ions indicates the negative part of the field gaining energy in the form of electrons by gaining:

1. Kinetic energy from the supply EMF – the conduction current.
2. Lithium electrons that are released from the lithium atoms of the lithium plate due to the photoelectric effect causing a separation of the electron from the atom and ionisation of the atoms occurring – displacement current.
3. Electrons from the gaseous environmental surroundings due to attraction force – displacement current.

The temperature measured on the surface of the battery decreases as the voltage pressure within the electric field system increases. This is due to more positive ions being produced from the lithium plate, this causes a bigger attractive force, attracting electrons out of gas molecules in the local gaseous environment. More ionisation of the lithium produces more positive ions and more negative lithium electrons.

Electrons are ejected out of the lithium atoms into the growing negative part of the electric field. This shows how the EMF causes the Endothermic Electric Effect.

The reaction is started with an EMF input inducing the photoelectric effect, equation (5) and (6). Electrons are vibrated out of the neutral lithium atoms by the vibration of the supply EMF bouncing back out of the lithium plate, in essence Newtons 3rd law can be considered, part of the atom's mass and energy has been released in a kinetic energy form. This vibration detaches outer valence electrons and produce Lithium⁺ ion atoms in the plate.

The lithium battery electric field charge shows the relationship between positive ions and negative electron current, how they act upon each other during the Endothermic Electric Effect charge. How they produce an electric field force and energy gain that is separate and apart from an EMF input of coulombs per second which is the catalyst to the reaction. There is a ***mass imbalance*** between the positive atom ions and the growing negative electron field, there is attraction and repulsion forces happening in 3 ways:

1. Repulsive forces between positive lithium ions, this causes equidistant spacing of ions in the lithium lattice plate. [79]
2. Repulsive forces between negative electrons of the negative field, this causes order in the attraction to the ions whilst endothermic.
3. Attraction forces between positive ions and negative electrons.

The lithium plate will take on different states of ion charge over time as the EMF input pressure is continually placed on the lithium atoms in the lithium plate. In respect to Figures 28, 29, and 30, they demonstrate how the lithium configuration of positive ion atoms can be realised from USW graph, as the voltage pressure increases over the time of the EMF applied charge.

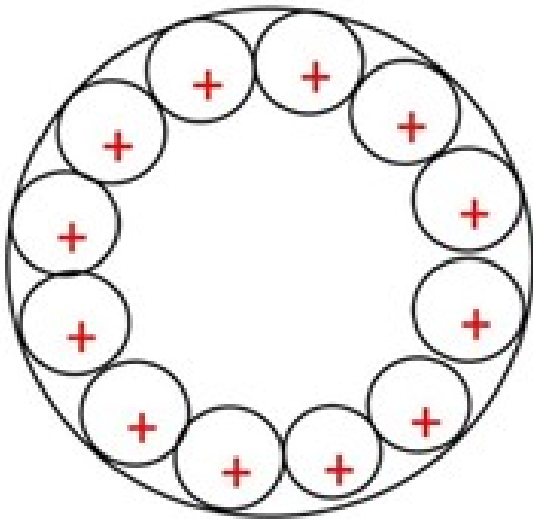


Figure 28: *Lithium from 0 to 2500 seconds.*

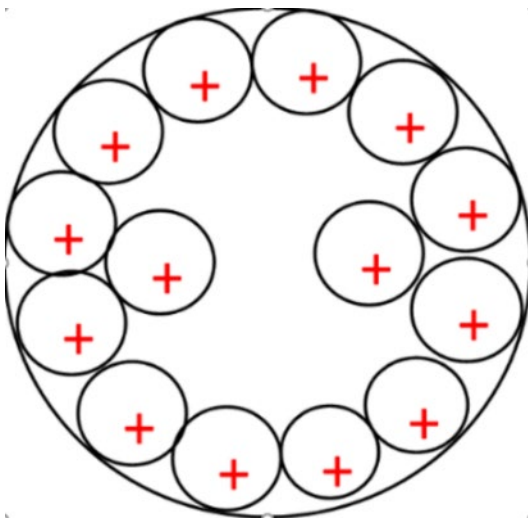


Figure 29: *Lithium at 6000 seconds with increased positive ions, the depth of ionisation has increased in the lithium plate.*

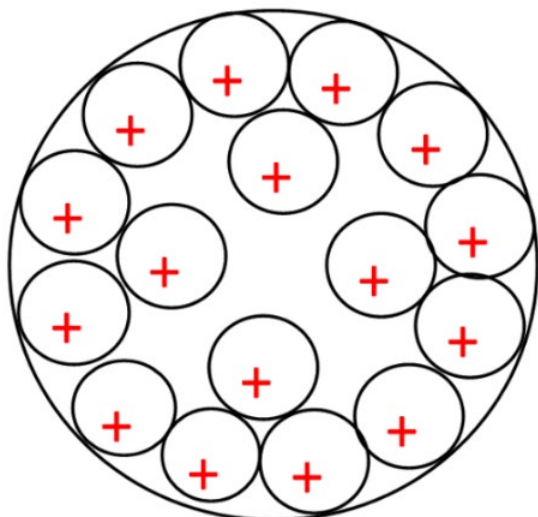


Figure 30: 7500 seconds, lithium ions at the final voltage, distributed in the lithium plate.

The Endothermic Electric Effect is an orderly state of charge. Centrifugal and centripetal forces are in action with increasing vibration, frequency and kinetic energy movement being the characteristics of the growing electric field. A change in entropy surrounding the electric field, identifies that there is order within the electric field charge of an open system whilst in an endothermic state. This is observed and seen as a drop in temperature on the battery surface and the surrounding air of the electric field of the battery, Figures 10, 27 and 35. The induced magnetic field force is directed to the electric field due to the high to low pressure surrounding the electric field, obeying the 2nd law of thermodynamics (1) (2).

The Effect of temperature on a voltage field

A given temperature has an associated characteristic energy; kinetic energy is the movement of this interaction in the form of electron exchange and today we recognise this energy level by using the value of Boltzmann's constant [80], also known as the Boltzmann–Planck constant:

$$1.3807 \times 10^{-23} \text{ joule's per kelvin (JK}^{-1}\text{)} \quad (7)$$

The higher the kelvin temperature of the battery in these experiments before initiating the charge, show there are more lithium atom ions⁺, and these ions⁺ attract a displacement current and is directed towards the electric field surrounding the lithium plate. This is due to a thermal temperature gradient in the local environment. Lithium is a very reactive low-density metal and is seldom found in its natural state in nature [81]. This means it has bonded with another element, for example, the chemistry of the battery used is Li PF₆. Lithium hexafluorophosphate is an inorganic compound with the formula LiPF₆. It is a white crystalline powder.

The voltage measurements seen before the start of the EMF charge in USW graph, is an indicator of the amount of ionisation within the lithium plate at its given starting temperature. The attractive *force out* from the lithium atoms ions⁺ in the plate is greater at the higher starting temperature of charge 3 due to more Li⁺ atom ions aligned in the lithium plate. Observing

the *battery charge 3* compared to *battery charge 1*, it can be seen it has more aligned Li^+ atom ions in its structure, making a greater '*attractive force out*' that is independent of the amount of EMF input pressure, which is measured in constant voltage and constant Coulombs per second into the system during the test (table 2).

Summary

Reasons why the Endothermic Electric Effect of the electric field reaction is seen in the electric field charge of the battery are:

1. the parameters applied to the system.
2. the poor conduction of lithium.
3. the low density of the lithium atom.
4. We have the ability to detect and analyse the endothermic electric effect reaction with temperature measurements and by applying gas law physics, equation 1 and 2.

There is no reason to believe this is an isolated reaction in electromagnetism during the charge of an electric field. Evidence contained within this work show that it is an integral part of the charge behaviour of an electric field. Electricity is a physical reaction.

Why Electricity is not a Chemical Reaction

If we were to consider that this observed electric field charge reaction was due to only a chemical reaction, one would expect the endothermic charge to end once all the chemical constituents were used up in the ensuing reaction. This is not the case, as we see an alternating state of reaction from endothermic to exothermic to endothermic states during the electric field charge. Not only this, but we are also able to continually charge and discharge the system for useful power. This again shows that electricity is a physical reaction that we can obtain by using chemicals and elements. We would need to write another outcome for electromagnetism if electricity was a chemical reaction. This would mean completely re writing electricity physics theory. The parameters of the system allow an insight into the quantum mechanics of electromagnetism.

There can only be one set of rules for electromagnetism!

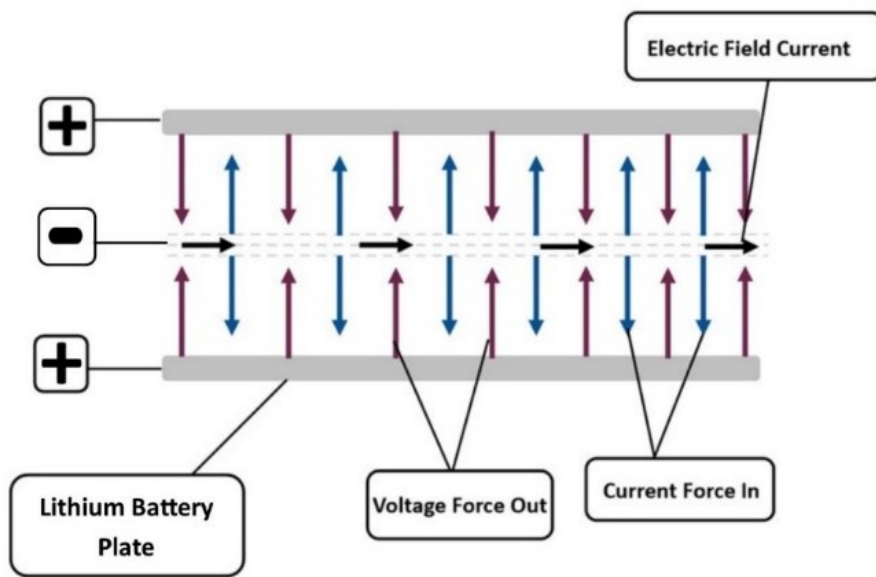


Figure 31: *Electric field depiction. The relationship between voltage and current.*

10 Lithium-Ion Battery Experiments at Swansea University

The Objective of this set of experiments was to explore and gain insight into the Endothermic Electric Effect that is seen during the lithium battery electric field charge. Using a different approach; to possibly identify unseen characteristics that might have laid hidden in the USW and NASA experiments. This was achieved by employing more temperature sensors. Three temperature sensors were used in the experiments in chapter 10 and 11. The hypothesis was to explore how far the reaction could be identified from the battery and what this could teach us about electric field charge in relation to its environmental gas surroundings. Many experiments were undertaken initially to define a good experimental method and what experiments to include in the final thesis. One experiment is included in chapter 10 that met these requirements, with other examples of experimental technique placed in glossary. NASA and USW had purpose-built facilities, showing repeatable data from the experiments. At Swansea University and at home (due to covid 19 plandemic), the facilities for this type of work were not so favourable yet observations were made of note and are included in the conclusions. After several experiments, it was noted that the oven at Swansea University was unable to keep a constant temperature within acceptable parameters, i.e., 1°C . The experiment included from Swansea was performed with the oven off and at room temperature which was constant during the experiment, and the desirable conditions for an electric field charge using a constant current, constant voltage from the power supply was achieved.

Circuit Design

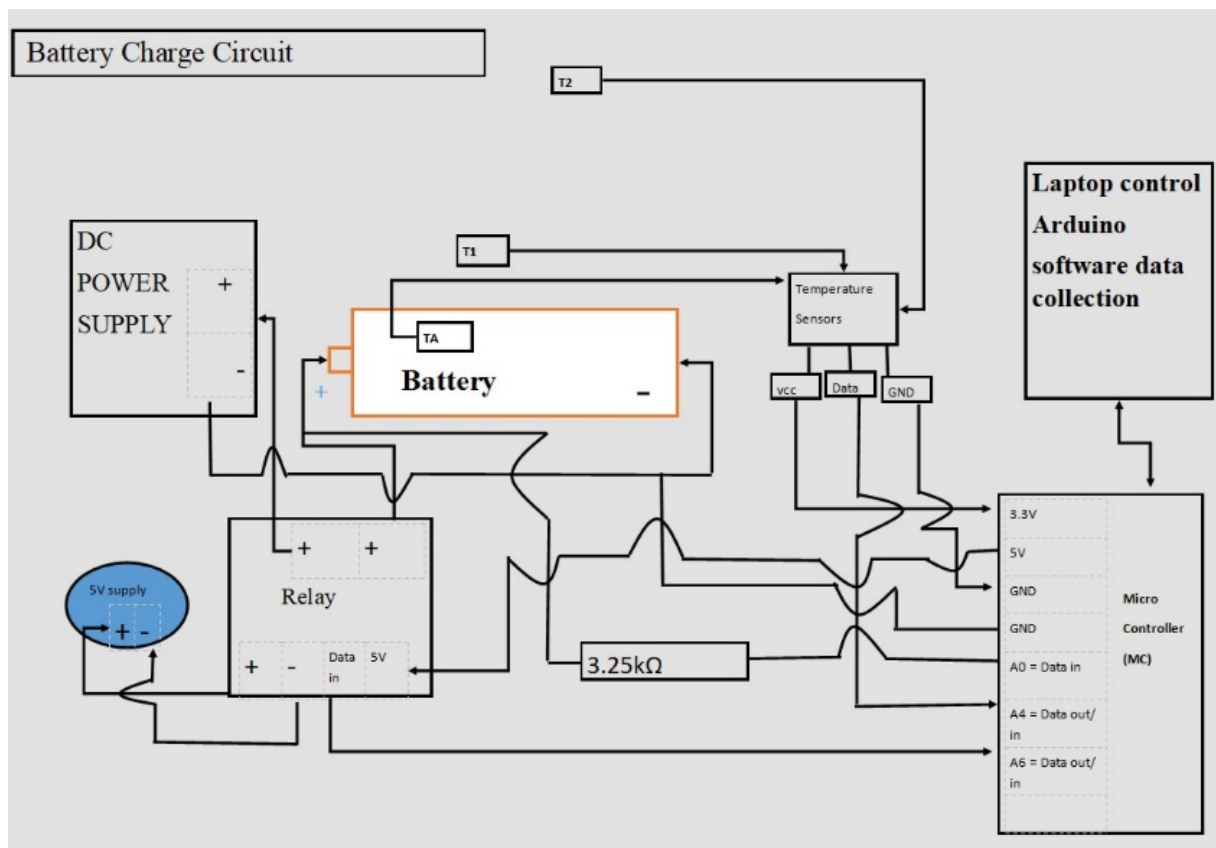


Figure 32: *Battery charging circuit.*

1. The Elegoo Uno R3 Microcontroller (MC) is suitable with Arduino open-source software and is used to command and control the circuit.
2. Dallas temperature sensors 3 of, are used. A 4K7 ohm pull up resistor is required on the Data acquisition pin to pull it up to 5V to ensure operating through the one wire data acquisition. The manufacture states the sensors have an accuracy of plus or minus 0.5⁰C. No calibration test was done between sensors; one will see from the graphs the sensors are very sensitive and what is important to observe with respect to the interpretation of the results, is the trend of temperature movement by all three sensors. By comparing the direction of the plotted temperatures of the 3 sensors, one can easily conclude and interpret the data with no doubt, showing if there is order or disorder within the charging electric field. These results are in keeping and follow on from the previous experiments by NASA and the USW experiments and are not stand alone observations.
3. A4 on MC= Digital input for the temperature sensors and outputted data through serial monitor.
4. A0 on MC = This is an analogue to digital converter input on the MC. The rising voltage in the electric field of the battery is recorded through the 3.25K Ω resistor, with assigned measurement conversion through Arduino software.
5. The data is collected and read in the serial monitor of the Arduino software program during the charge cycle.
6. Graphs were generated using Microsoft excel. The use of Microsoft excel is always desired by industry and is considered an industry standard.
7. A6 = Digital output control to Relay, for high or low position operation of charge circuit on MC.
8. The power supply on/off is controlled through this high-current relay; DC30V 10A. Equipped with indication LEDs for Relay output status, the software code for the relay is seen through digital pin 13. The relay is driven with a separate 5V power supply.

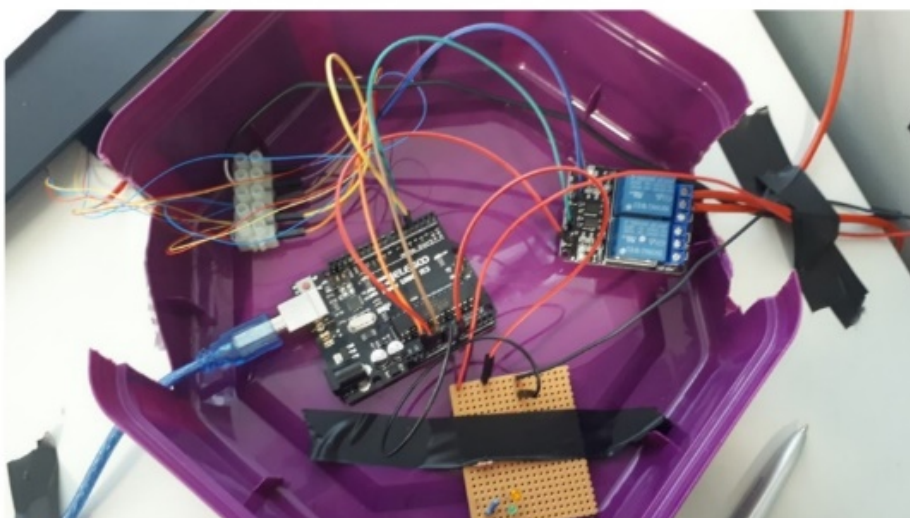


Figure 33: *Electronic parts, MC, Resistor, Relay Connections stored in a Quality Street chocolate box, with side cuts for passing of wires to the rest of the circuit.*

10.1 Swansea Experiment

Method

This experiment was performed at room temperature, with the battery placed in the switched off oven, therefore ambient room temperature, T_2 , is equal to the oven temperature. The battery was placed in the oven to prevent movement of air around the battery. Three temperature sensors were used as seen in figure 34.

A constant current of $C/2$ was applied which in this instance was 9 amps per second with a constant voltage pressure of 4.2V set on output of power supply. This battery was selected due to its similar capacity amp hour size as the A123 battery (18amp hour) used in USW experiments. As you can see the EMF carrying wires for current and voltage are not the same size as seen in the USW experimental set up (figure 26). There is also time recorded data included before the $C/2$ 9amp per second charge was initiated.

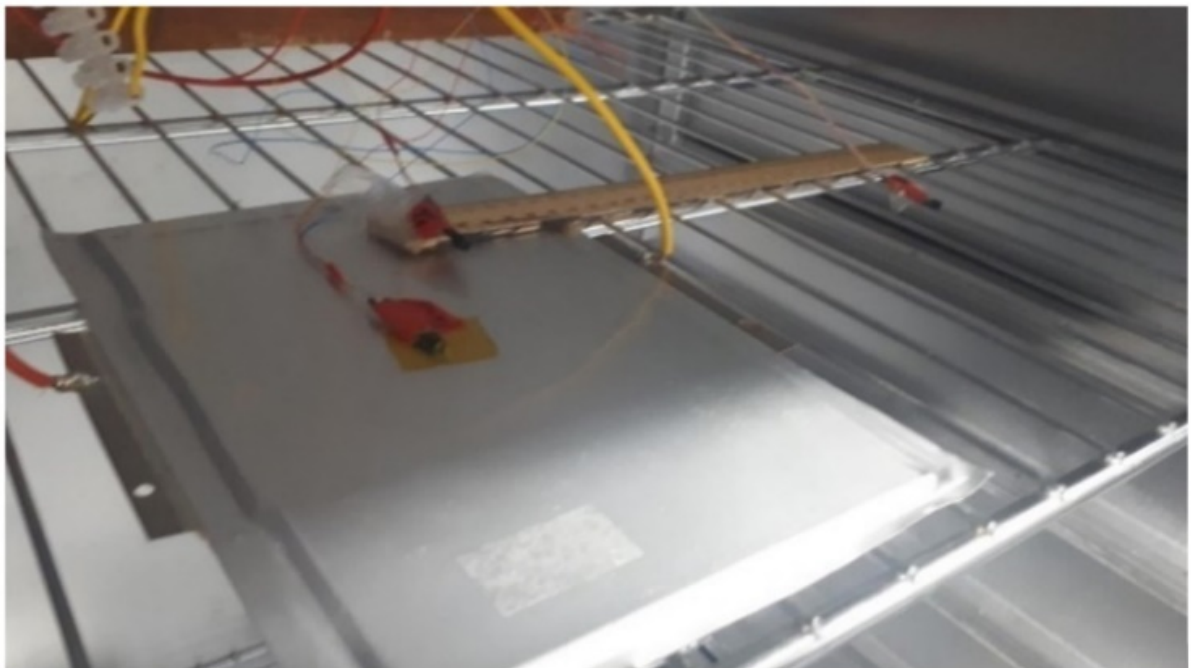


Figure 34: *Lithium battery with temperature sensors,*

Taped to Battery temperature sensor = TA ,

10mm from battery temperature sensor = $T1$,

Ambient temperature sensor 17cm from battery = $T2$

RESULTS

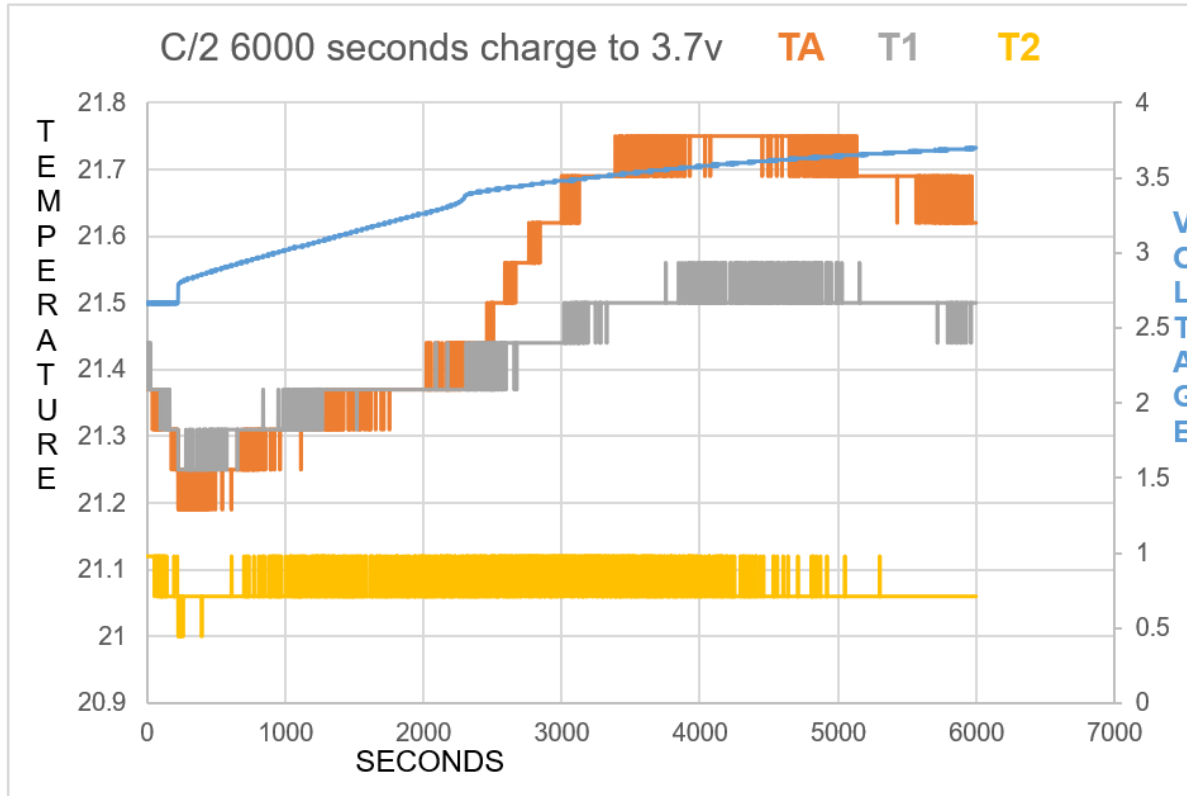


Figure 35: Data acquisition for 6000 seconds. TA and T1 show a cooling around the battery before the EMF charge is engaged at the beginning of data collection for 225 seconds. Ambient room temperature T2 shows drop in temperature when charge is engaged at 225 seconds.

This data reveals characteristics of the charge. TA and T1 show a higher temperature than T2. With T2 measuring the ambient oven temperature before charge is engaged. This can be explained:

1. There is some voltage in the battery, 2.6V, and hence a certain amount of ionisation in the lithium atoms. The battery was discharged prior to re-charge and its thermal temperature was slightly higher than T2 ambient temperature. This higher thermal temperature compared to ambient temperature T2, is causing the endothermic reaction and the lowering of pressure around the battery that is being measured by TA and T1, before engaging the EMF from the power supply.
2. One will notice how all temperature sensors record a drop in temperature at 225 seconds when the EMF is engaged, seen in figure 35 and table B.
3. At 17 cm from the battery, T2 records temperature drop at beginning of EMF input.

4. T2 shows constant temperature throughout experiment other than when the EMF is first initiated and again when TA temperature starts reducing at 5400 seconds.

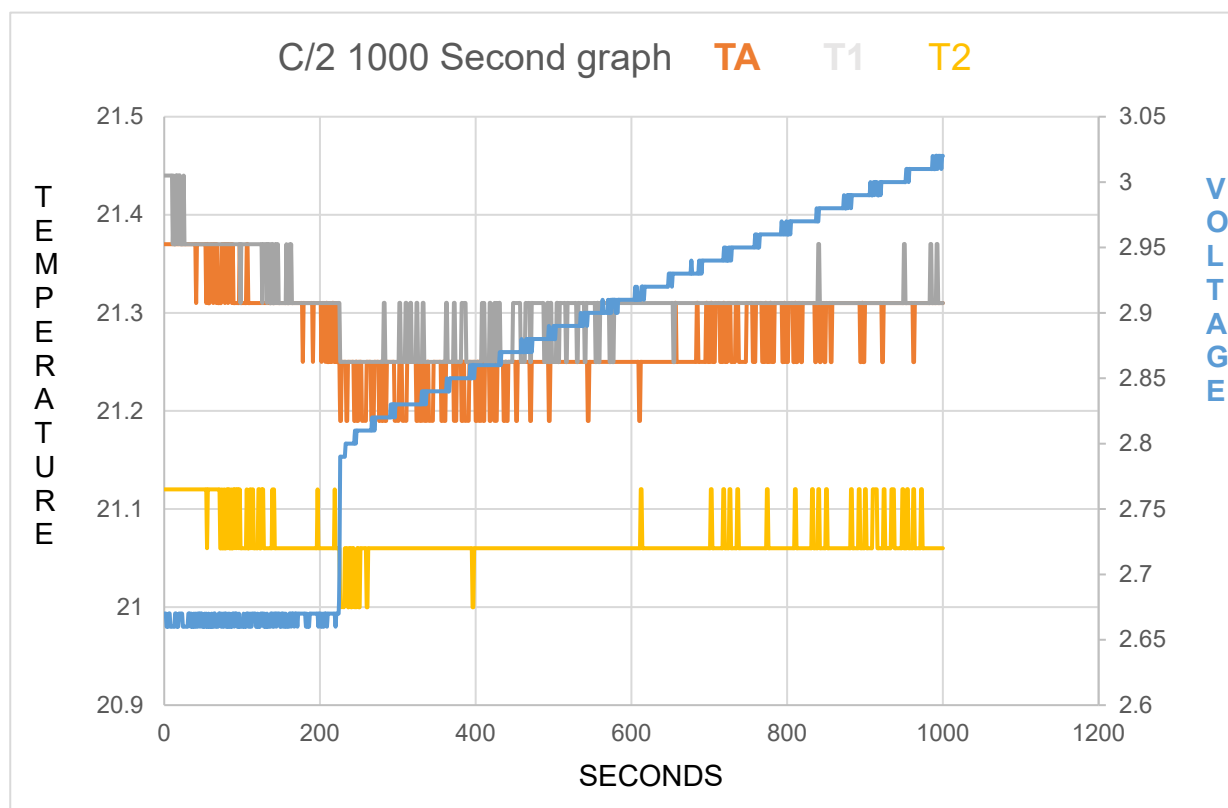


Figure 36: TA shows Endothermic cooling reaction for 7 mins 34 seconds at start of electric field charge when EMF is applied.

1. TA and T1 show cooling around the battery before the charge is engaged, this is thermal self-charge due to elevated thermal temperature compared to room temperature.
2. The battery starting voltage is 2.66V. There is a raised state of temperature measured by TA and T1, compared to T2.
3. TA starting temperature = 21.37C
4. T2 starting temperature = 21.12C
5. T1 follows the same direction of temperature trends as TA.
6. T2 shows constant temperature throughout experiment, it is interesting to see a temperature drop by T2 when the charge is first engaged at 225 seconds.

Even by shaking or handling lithium batteries, ionisation can occur.

Table A: *Data collection before initiating charge.*

	VOLTAGE	TA	T1	T2
Time in seconds	2.67	21.37	21.44	21.12
0	2.67	21.37	21.44	21.12
1	2.67	21.37	21.44	21.12
2	2.66	21.37	21.44	21.12
3	2.66	21.37	21.44	21.12
4	2.66	21.37	21.44	21.12
5	2.67	21.37	21.44	21.12
6	2.67	21.37	21.44	21.12
7	2.66	21.37	21.44	21.12
8	2.66	21.37	21.44	21.12
9	2.66	21.37	21.44	21.12
10	2.66	21.37	21.37	21.12
11	2.66	21.37	21.44	21.12
12	2.66	21.37	21.37	21.12
13	2.67	21.37	21.37	21.12
14	2.67	21.37	21.44	21.12
15	2.66	21.37	21.44	21.12
16	2.66	21.37	21.44	21.12
17	2.66	21.37	21.37	21.12
18	2.67	21.37	21.44	21.12
19	2.67	21.37	21.44	21.12
20	2.67	21.37	21.37	21.12
21	2.67	21.37	21.37	21.12
22	2.67	21.37	21.37	21.12
23	2.66	21.37	21.37	21.12
24	2.66	21.37	21.44	21.12
25	2.66	21.37	21.37	21.12
26	2.66	21.37	21.37	21.12

Table B: *At 224 seconds EMF is applied to battery and all 3 sensors react in same direction.*

TIME	VOLTAGE	TA	T1	T2
204	2.66	21.31	21.31	21.06
205	2.67	21.31	21.31	21.06
206	2.67	21.25	21.31	21.06
207	2.67	21.31	21.31	21.06
208	2.66	21.31	21.31	21.06
209	2.67	21.25	21.31	21.06
210	2.67	21.25	21.31	21.06
211	2.67	21.31	21.31	21.06
212	2.67	21.25	21.31	21.06
213	2.67	21.31	21.31	21.06
214	2.67	21.25	21.31	21.06
215	2.67	21.31	21.31	21.06
216	2.67	21.31	21.31	21.06
217	2.67	21.25	21.31	21.06
218	2.67	21.31	21.31	21.12
219	2.66	21.25	21.31	21.06
220	2.67	21.31	21.31	21.06
221	2.67	21.25	21.31	21.06
222	2.67	21.25	21.31	21.06
223	2.67	21.31	21.31	21.06
224	2.7	21.25	21.31	21.06
225	2.79	21.19	21.25	21
226	2.79	21.19	21.25	21
227	2.79	21.25	21.25	21
228	2.79	21.25	21.25	21
229	2.79	21.25	21.25	21
230	2.79	21.25	21.25	21
231	2.79	21.25	21.25	21.06
232	2.8	21.25	21.25	21.06
233	2.8	21.19	21.25	21.06
234	2.8	21.19	21.25	21.06
235	2.8	21.25	21.25	21
236	2.8	21.25	21.25	21
237	2.8	21.25	21.25	21.06
238	2.8	21.25	21.25	21.06
239	2.8	21.25	21.25	21
240	2.8	21.25	21.25	21
241	2.8	21.25	21.25	21.06
242	2.8	21.25	21.25	21.06
243	2.8	21.19	21.25	21

Table C: *continued data collection, showing temperature trends*

TIME	VOLTAGE	TA	T1	T2
242	2.8	21.25	21.25	21.06
243	2.8	21.19	21.25	21
244	2.81	21.19	21.25	21
245	2.8	21.25	21.25	21
246	2.81	21.25	21.25	21
247	2.81	21.19	21.25	21.06
248	2.81	21.19	21.25	21.06
249	2.81	21.25	21.25	21
250	2.81	21.25	21.25	21
251	2.81	21.25	21.25	21.06
252	2.81	21.25	21.25	21.06
253	2.81	21.19	21.25	21.06
254	2.81	21.19	21.25	21.06
255	2.81	21.19	21.25	21.06
256	2.81	21.19	21.25	21.06
257	2.81	21.19	21.25	21.06
258	2.81	21.19	21.25	21.06
259	2.81	21.25	21.25	21
260	2.81	21.25	21.25	21
261	2.81	21.25	21.25	21.06
262	2.81	21.25	21.25	21.06
263	2.81	21.25	21.25	21.06
264	2.81	21.25	21.25	21.06
265	2.81	21.19	21.25	21.06
266	2.82	21.19	21.25	21.06
267	2.81	21.19	21.25	21.06
268	2.82	21.19	21.25	21.06
269	2.81	21.25	21.25	21.06
270	2.82	21.25	21.25	21.06
271	2.82	21.25	21.25	21.06
272	2.82	21.25	21.25	21.06
273	2.82	21.25	21.25	21.06
274	2.82	21.25	21.25	21.06
275	2.82	21.19	21.25	21.06
276	2.82	21.19	21.25	21.06
277	2.82	21.25	21.25	21.06
278	2.82	21.25	21.25	21.06
279	2.82	21.19	21.25	21.06
280	2.82	21.19	21.25	21.06

Conclusions

The shape of the voltage line in figure 35 is different to the USW graph and yet similar to NASA graph. You can hypothesise that this is due to the chemistry of the battery and how the ionisation occurs due to the separation of the chemistry within the battery. The trend of the temperature lines match NASA and USW graphs, showing endothermic, exothermic, and endothermic reaction. The test was stopped before the battery electric field would become exothermic again at end of charge. This was because Swansea supervisors were concerned of fire risks.

T2 shows at time 225 seconds how the direction of energy flow is towards the electric field at the start of the endothermic charge, this sensor is 17 CM from the battery.

TA shows endothermic reaction for 7mins 34secs at start of charge. The reaction becomes endothermic again at 5167 seconds at 3.67V.

The temperature sensors show a better than stated performance by the manufacture, as can be seen from the results. There is some flicker, but the trend is easily read from tables A, B and C. Complying with high to low pressure, T2 to T1 and to TA. The direction trend seen in the data is the same for the exothermic region, in agreement with figure 35.

The frequency is low at this voltage pressure, but the displacement current is noticeable and measured.

11 Home Experiments

11.1 Test 1

In this experiment the Sony 18650 battery was used, this being the same type of battery chemistry NASA explored in chapter 4. There was no voltage or current applied to the battery. The battery temperature is elevated by 0.2 C compared to the ambient room temperature (seen by T2) at the start of data collection. This elevated thermal temperature was applied to the battery by placing the battery in home oven. The battery was then placed in the volume containment (figure 42) and connected to the circuit. The voltage and temperature data were recorded with respect to time.



Figure 37: Positioning of temperature sensors

Table D

Colour Code for Figures
Taped to Battery temperature sensor = <i>TA</i> ,
15mm from battery temperature sensor = <i>T1</i> ,
Ambient temperature sensor 10cm from battery = <i>T2</i>
Voltage = <i>Blue</i>

Results

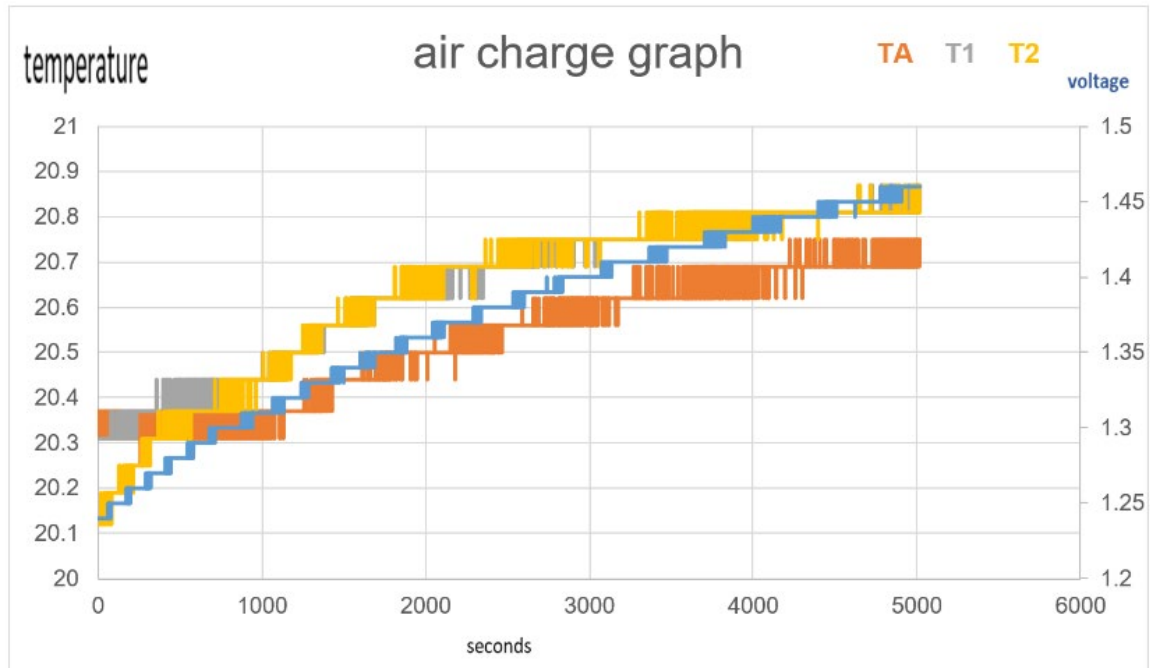


Figure 38: 5000 seconds, no voltage, no current applied.

1. T1 positioned 15mm from battery initially reads the same temperature as the battery sensor TA.
2. The voltage on blue line increases through 5000 seconds.
3. The ambient temperature T2 increases throughout the experiment due to room temperature increase throughout the experiment.
4. TA and T1 unlike T2, do not follow the same initial temperature increase.
5. T1 shows an increase temperature trend throughout the data collection due to the room temperature increasing throughout the test period, but what is important to notice is this trend does not begin until 300 seconds into the experiment.
6. TA remains the same temperature until 1250 seconds, not following the same temperature rise trend as T2 ambient temperature.
7. TA follows the same temperature rise trend from 750 seconds as T1 and T2, this trend continues throughout the rest of the data collection time yet always following a lower temperature data trajectory.

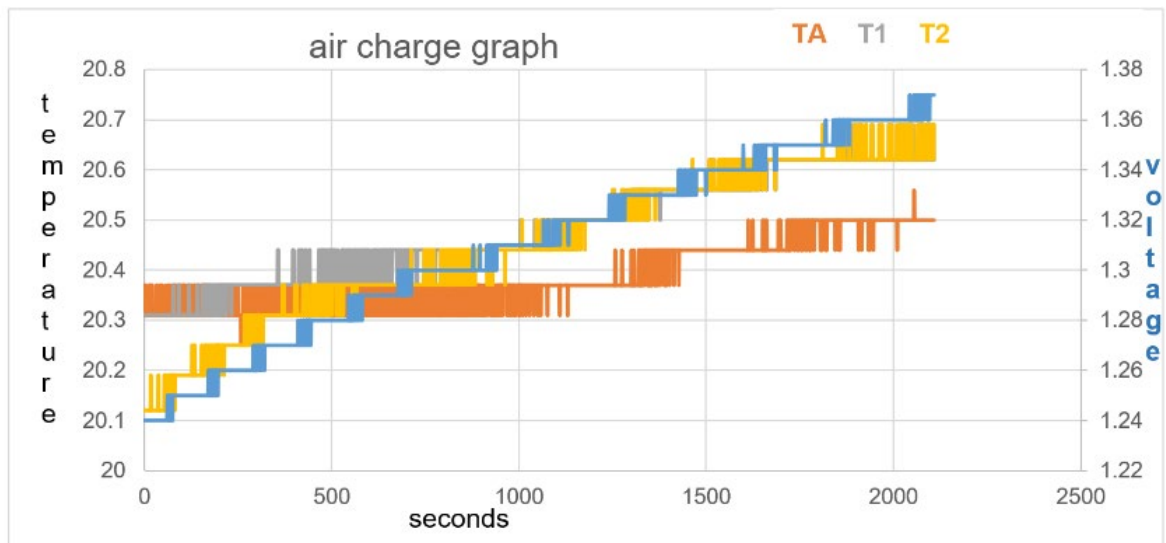


Figure 39: data collection to 2100 seconds

Voltage rises in first 500 seconds = 0.04V

Temperature stays the same on TA for 1250 seconds.

T1 does not follow T2 temperature rise characteristics until approximately 900 seconds.

11.1.1.1 Test 2

In this experiment the Panasonic 18650 battery was used, there was no voltage or current applied to the battery, only a raised temperature at the beginning of the data collection compared to room temperature. Again, this was achieved by warming in home oven. The battery was connected to the circuit and the voltage and temperature data was recorded with respect to time.

The difference between test 2 compared to test 1 is:

- In test 2 the battery temperature is higher than the ambient temperature of room by 1.7C rather than 0.2C in test 1.
- The initial voltage of the battery is lower in test 2, with only 0.25 starting voltage pressure.

RESULTS

The imbalance in thermal temperature between room temperature T2 and battery temperature TA, shows how TA drops in temperature by 1.4C in the first 2600 seconds and raises the battery voltage by 0.63V

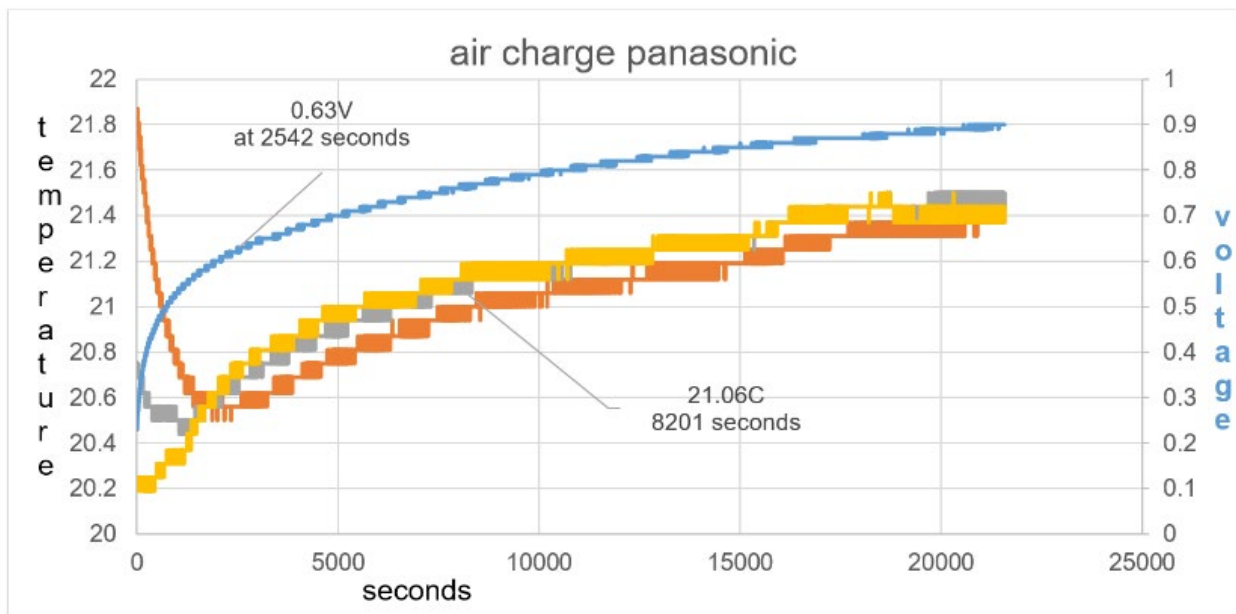


Figure 40: T1 at first is raised in temperature compared to T2, this is the thermal heat of the battery rising the temperature reading of T1. T1 continues to show a lower temperature than T2 at least until 8201 seconds as seen.

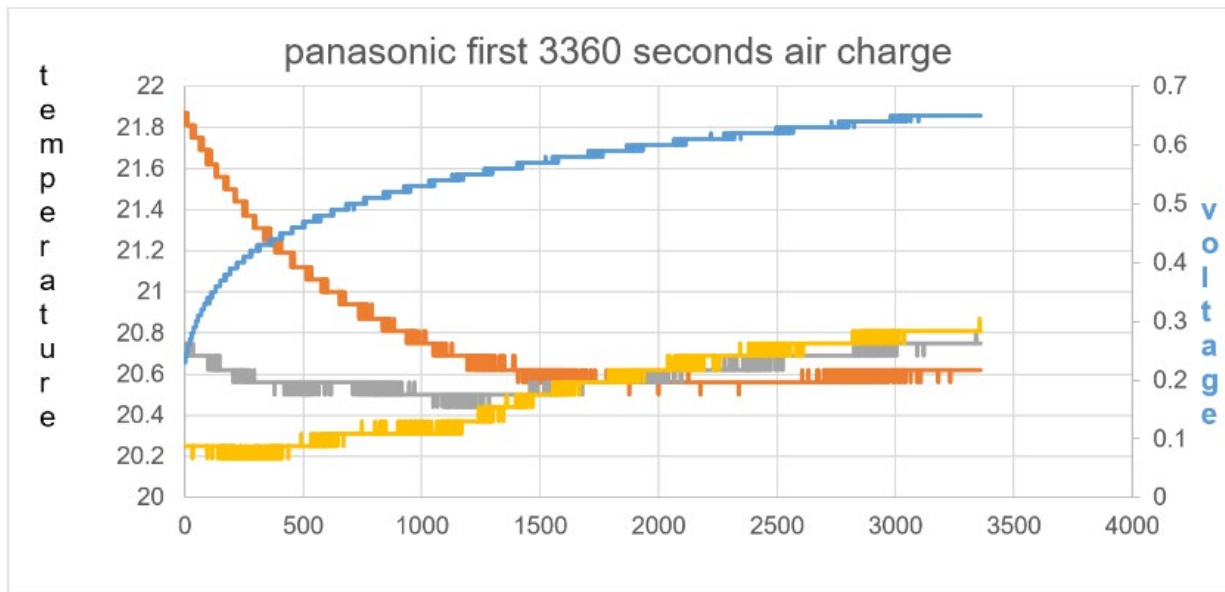


Figure 41: *Imbalance of starting temperature between TA and T1, compared to T2, shows the direction of kinetic energy flow is towards the electric field charge. This shows that some of the electric field charge is coming from the surrounding air electrons. Even when TA equals T1 and T2 at 1750 seconds the voltage increase continues throughout the self-charge as seen. It is not until 2600 seconds does TA show the same trend as T1 and T2. Remarkably this shows an endothermic electric effect, whilst the trend is a rise in room temperature shown consistently by T2 throughout the experiment.*

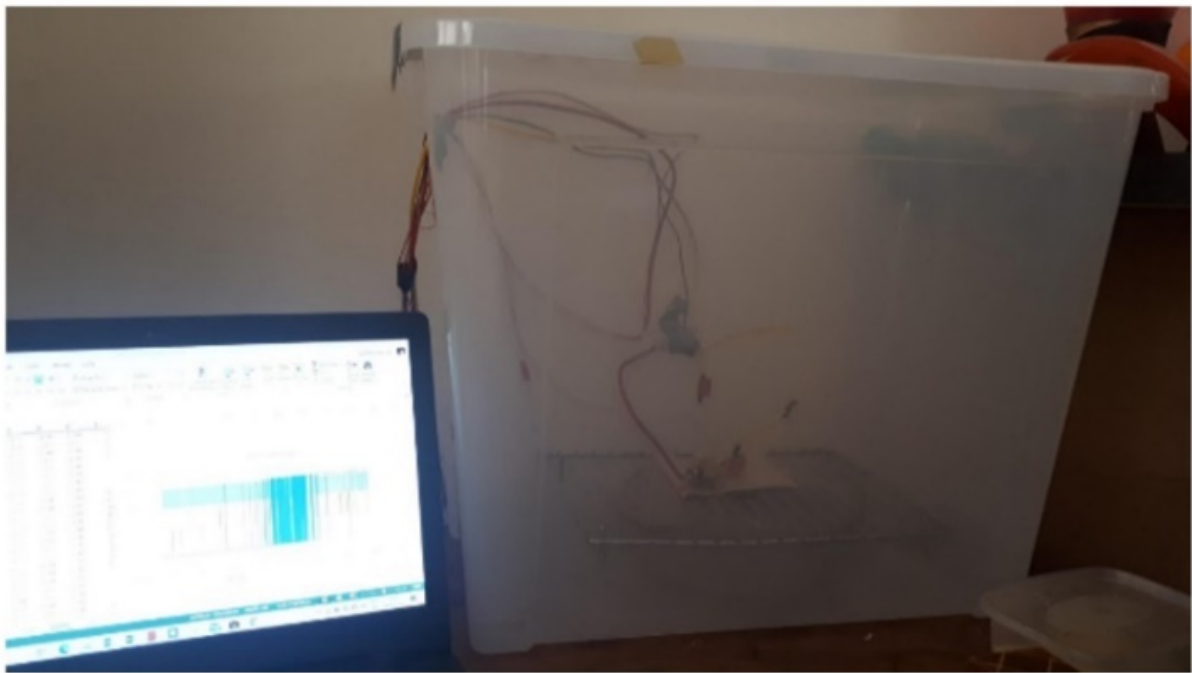


Figure 42: *Temperature sensors, data collection and volume containment.*

Observations

Voltage rises in first 500 seconds = 0.23V

TA shows drop in temperature for first 2500 seconds = 1.2C

T1 shows drop in temperature for first 1400 seconds = 0.3C

T2 shows continual temperature rise in the experiment

The electric field charge converts the higher thermal temperature of the battery into voltage and is the photoelectric effect catalyst to the pursuing reaction (5) (6).

The displacement current is recognised by T1 but not T2 at this low voltage charge.

Conclusions for no current no voltage applied, for Test 1 and Test 2

Kinetic energy will flow from a warmer temperature zone to a cooler temperature zone, this we know and understand through the 2nd law of thermodynamics. What one notices here is, the battery temperature is elevated, as shown by TA, compared to ambient temperature T2. There is no voltage or charge being applied to these tests. A different size temperature drop was measured in respect to time at the beginning of test 2 compared to test 1. In test 1 and 2, the raised thermal temperature of the battery acts as the catalyst to the reaction and is measured by TA compared to ambient temperature measured by T2. This shows that the raised thermal temperature is the catalyst to the reaction that pursues, and the Photoelectric Effect continues to take place even when TA measures a below ambient temperature. In Test 2 figure 41, whilst the charge process is happening in the electric field, TA registers a drop in temperature for 2500 seconds due to kinetic energy flow into the negative electric field. The available kinetic energy within the ambient air temperature within the containment box, undergoes an attraction reaction with the lithium ions. Electrons are attracted to positive lithium ions, there is a high pressure to low pressure flow and attraction reaction happening in the surroundings of the electric field system, this is observed by T1 in figures 39 and 40 and again confirms equation 1, the 2nd law of thermodynamics applies. The battery electric field charge is displaying an endothermic heat gain whilst the ambient temperature within the box is rising, the self-charge and voltage rise relates to a gain in kinetic energy within its electric field, as seen in test 1 and test 2.

Lithium is the lightest metal known to man, a non-dense alkali metal, compared to copper which is denser due to atomic mass structure. Lithium is able to ionise due to the raised thermal temperature of the battery acting as the energy catalyst. The battery is 0.23V and 21.87C at start of Test 2, and self-charging to 0.9V and 21.44C at end of test 2. It is not until 2620 seconds of self-charge in terms of voltage rise, does the battery temperature TA show an increase in temperature in line with T1 and T2 in test 2. The endothermic charge is continuous until 20,577 seconds shown in figure 40. Equilibrium in electric field force between positive and negative forces is seen from 20,577 seconds to 21,565 seconds, figure 40.

11.1.1.2 Test 3

Samsung 18650 Battery was used. The battery was first cooled in the fridge to below ambient room temperature. The objective was to see if the electric field charge behaved the same as when the battery starting temperature was above ambient room temperature, as in test 1 and test 2.

RESULTS

Starting voltage = 1.86V

Final voltage = 1.00V

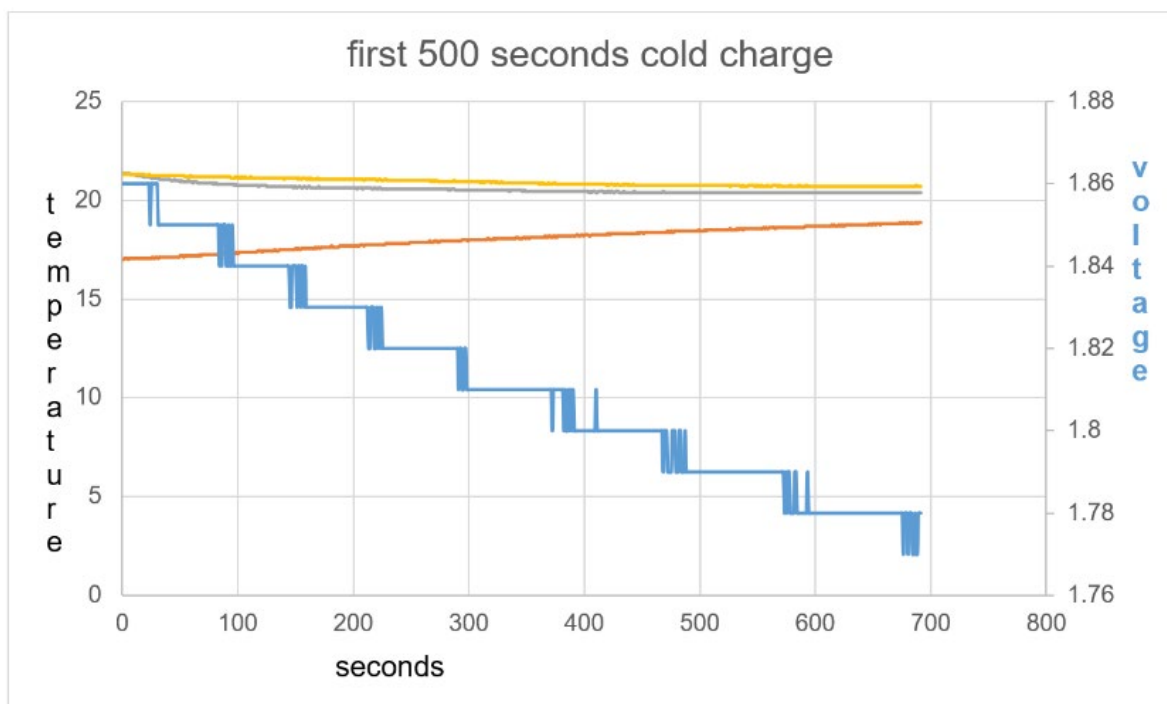


Figure 43: The opposite effect in regard to electric field charge is seen compared to test 1 and 2. A discharge is observed.

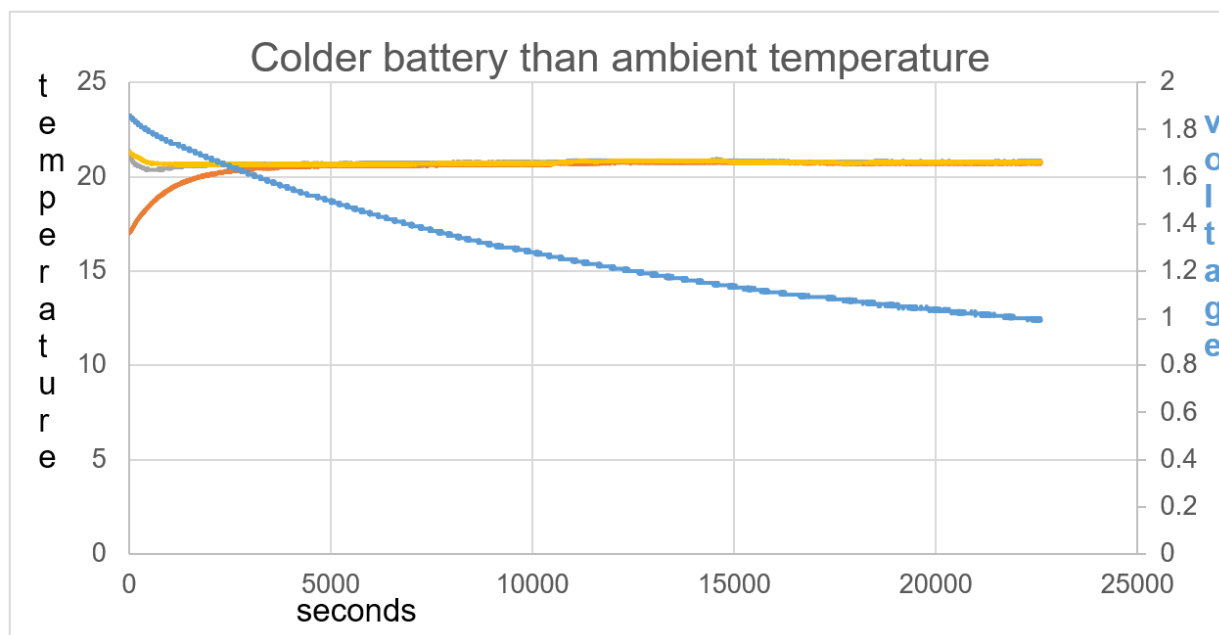


Figure 44: *The battery shows an exothermic reaction with voltage decrease with respect to time.*

The exothermic reaction identified by TA of the electric field charge of the lithium battery causes de-ionising of lithium atoms⁺ and a drop in voltage is seen in figures 43 and 44. When this reaction is started, it continues, as seen through 22,250 seconds.

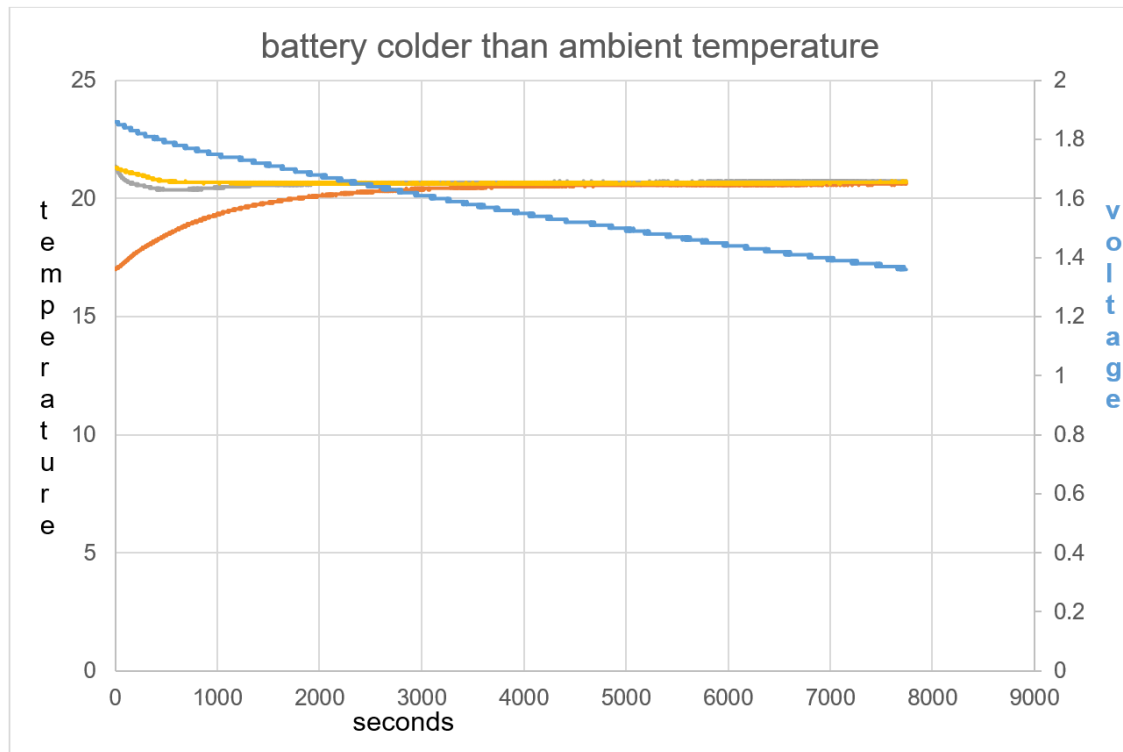


Figure 45: *T1 and T2 slightly cool at beginning of data collection with TA warming.*

CONCLUSIONS

Due to the EMF input force caused by the ambient thermal temperature surroundings and being above the temperature of the battery at the beginning of the experiment, the reaction is seen as exothermic in electric field immediately, and hence discharge of the ions⁺ in the electric field starts and continues throughout the test. The lower energy status temperature of the battery surface compared to ambient temperature and hence a pressure gradient causes a big attraction of electrons from surrounding gases and they are attracted to the ionised lithium atoms in the electric field and voltage discharge is caused by frictional force, the vibrational force of the ions⁺ is lower than the ambient temperature vibration and hence voltage discharge to surroundings. This shows that a discharge of the electric field is exothermic and also shows the necessity of an EMF for charge.

The charge of the electric field in test 1 and 2 is endothermic due to the EMF causing a higher force outward than the surrounding environmental temperature force inward, and hence a charging electric field is initiated compared to the discharge observed in test 3. Test 3 has a lower energy vibrational force in the ions compared to the inward temperature vibrational force and hence a discharge is the trend due to friction at the surface of the lithium ions⁺.

12 More Conclusions

The USW experiments along with the NASA experiment can be thought of as a reliable marker in science for how to expect an electric field to charge within controlled parameters using a continuous EMF with respect to time, and how the force interactions of positive ions and negative electrons within parameters of a system define the entropy of a system.

The Endothermic Electric Effect is seen in a parameter-based charge. The pursuing reaction is anything but obvious in terms of understanding the physics.

COMPARING NASA AND USW GRAPHS

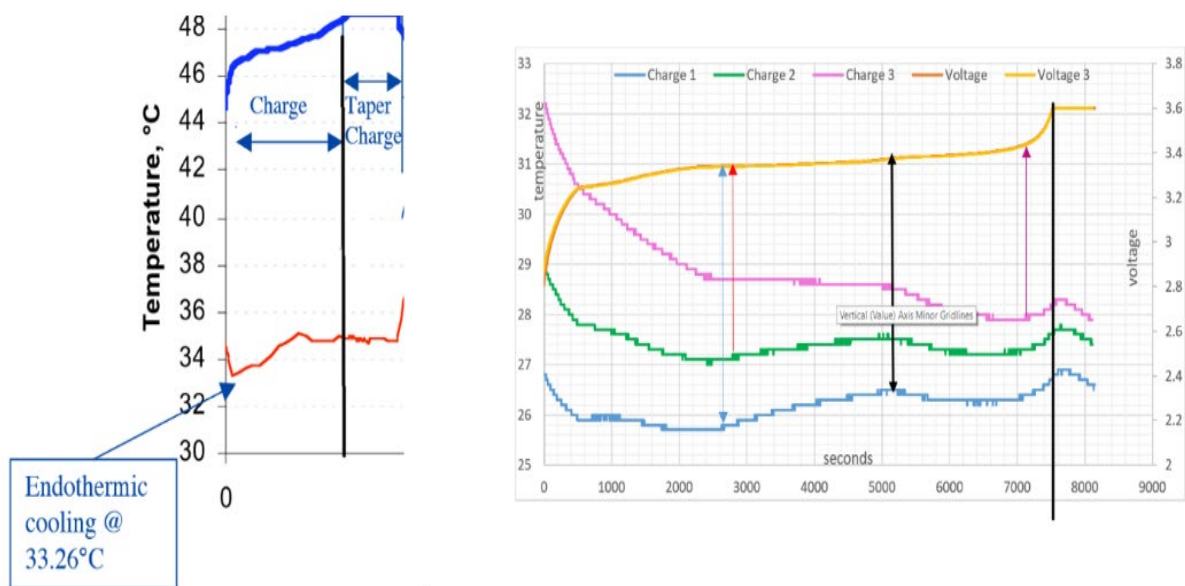


Figure 46: NASA GRAPH and USW GRAPH

To validate the reliability and quality of the results in the NASA and USW experiments, the graphs are placed together for comparison:

- The temperature lines follow the same curves (red line on NASA graph, the blue line on NASA graph is the voltage line, see figure 10 for full NASA graph)
- The black line (not arrow) on both graphs signifies the end of the charge cycle
- The endothermic Electric Effect is seen twice in all charges, revealed by the temperature curves

NASA conclude in [58]:

- *Heat generation correlates well with temperature.*
- *Change in equilibrium potential with temperature is used to calculate entropy.*

This is how NASA Define the charge of an electric field.

Reasons how Endothermic becomes Exothermic and Exothermic becomes Endothermic in USW Graph

The continuous EMF input causes ionisation of the lithium atoms and lithium electrons are ejected into the negative electric field current. The electrons are being vibrated off the atoms as the joules repulsive pressure between the atom ions builds within the lattice. The increasing voltage produces more vibration within the ions and the *frequency force out vibration* increases with respect to time as seen between 0 seconds and 2500 seconds of USW graph. This reaction initiates an endothermic heat gain response sourced from the environmental surroundings. The electric field in all three charge curves in USW graph increase in Endothermic Electric Effect charge.

The negative electron part of the electric field, which is attracted to the positive atom ions, (*The 'force in' of the electrons*) is due to the expanding field outwards and it has increased in surface area due to the attraction to the increased atom ions⁺ (joules '*force out*' increase) [82]. The mass size imbalance between atom ions and electrons is an important factor, and with the electrons ability to move, this allows for an orderly attraction of an opposite monopole to the ions⁺ monopole. Due to the repulsion force amongst electrons, the field will grow in layers (lines of flux) outwards from the positive ions⁺ of the lithium plate.

Notice from where the black arrow is placed on the USW graph, the voltage pressure gradient increases more rapidly between 5200 seconds to 7200 seconds. The positive ion surface area (seen as the voltage lines) has increased more rapidly compared between time 2600 seconds and 5200 seconds. Between time 2600 seconds and 5200 seconds the voltage line is almost horizontal with very little increase in ionisation within the lithium plate. A comparison of Townsend's figure 20 to figure 27 is very poignant to observe, the characteristics of the current to temperature change during charge, it can be considered as identical features although Townsend was plotting the current and not the voltage rise and did no temperature testing or time measurements.

Frictional force on the lithium ions + between time 2600 seconds and 5200 seconds on USW graph eventually causes more ionisation at 5200 seconds. This is because of the frictional *force into* the plate by the growing electron field '*force in*'. Between time 2600 seconds and 5200 seconds the system is exothermic with increasing vibration and frequency, there is raised electron chaos with the exothermic reaction at the lithium plate.

(As seen in Peek's work, chapter 19.1, the corona around a conductor will become visible due to the wavelength of vibrational frequency and there is exothermic electron chaos within the system.)

The attractive *force out* of the positive ions significantly increases between 5200 seconds to 7200 seconds, more ionisation of neutral lithium atoms deeper within the lithium atom lattice has occurred.

It can be seen, between 0 to 2600, 0 to 2800, 0 to 4400 seconds, charges 1,2,3 respectively in the USW graph, the electric field charge configuration is the **Endothermic Electric Effect** and

then again between approximately 5200 seconds to 7200 seconds. It can be observed in charges 1, 2 and 3, the extra *force out* due to more positive ions populates the electric field current with more lithium electrons and environmental gas electrons in an orderly reversal of entropy, this is: ***Order in the system with no friction.***

During the Endothermic Electric Effect, the attraction of the positive ions attracts more electrons from the environment, this means more self-sourced kinetic energy into the electric field.

The Endothermic Electric Effect is a physical reaction with the Photoelectric Effect (5) (6) being the catalyst to the reaction.

The Endothermic Electric Effect is recognised by a reversal of entropy and a drop in temperature and is measured in the experiments on the battery surface and the environmental surroundings with temperature sensors.

Frictional '*force in*' by the negative part of the field towards the positive part of the field will cause ionisation during charge. The system will change from being an exothermic reaction to an endothermic reaction when there is enough frictional force to cause more ionisation in the plate. (5200 seconds to 7200 seconds USW graph).

The Endothermic Electric Effect is seen as a non-linear curve (or expressed as a curved linear) in these battery charges due to the slowdown of ionisation in respect to time during the electric field charge.

The first Endothermic Electric Effect reaction is seen as 65 to 80% as the overall SOC in the electric field charge in USW graph.

A continual EMF input force will eventually result in more ionisation of the lithium and thermal temperature rise in the battery towards thermal runaway of the lithium. If left unchecked, this will lead to the boiling and melting of the lithium.

How Secondary Ionisation Occurs

Between the red arrow and black arrow on USW graph, it is seen that the system becomes exothermic, and ionisation of the lithium measured in volts is slowing in respect to time. With primary ionisation complete and a repulsion force between atom ions around the outside circumference of the metal lattice. The frictional force must build in respect to time before any secondary ionisation will occur in the metal. Even at this low voltage pressure it is quite easily seen that the lithium is being ionised by the vibration force of the EMF current due to the attraction to the atom + ions. The high pressure to low pressure gradient is reversed in the exothermic configuration.

There are no cathode rays or light applied in these experiments, figures 10, 27 and 35, just an EMF force measured in amps per second. The voltage measurement rise is a product of the amps per second and the endothermic electric effect directed to the material atoms of the battery. Due to constant current, voltage rise is seen during the exothermic region of charge, albeit slower due to less ionisation of material atoms and inefficiency in the state of charge.

A Larger Surface Area of Reaction Will Give More Available Atoms for An Increase in Current.

It is simple to deduce that a collision causes friction and any sort of continual friction in a system will increase the temperature per surface unit. Therefore, collisions will rise the temperature and the entropy of a system or chaos in a system will increase. There are temperature differences during the charge of a system's electric field with respect to time, definitively causing two different types of charge, *endothermic and exothermic, and this has not been considered in history until now.*

It was not until the measurements by Naudin on his Newman Generator experiments, and NASA experiment, did this unobvious reaction become visible. The increase in gas current is due to attraction to the positive cations of the system. In USW graph, the lithium can be considered as an anode, a positive cation [83] during the electric field charge due to its ionisation. First there is order in this attraction and repulsion system and this conclusion is supported by the temperature drops around the electric field, measuring a gain in displacement current charge from outside of the electric field. The attraction reaction is towards the cation and not away from the cation, this is confirmed by the measured temperature drop from the surrounding volume of gas in the NASA, USW, and Swansea experiments. The area around the cation is negative, this is because of the attraction of the electrons to the positive cation. Electromotive forces take place at the surface of the conductor where the opposite charges will interact and due to this, there will be a point in time when the reaction becomes frictional which will make the system exothermic.

The endothermic heat gain is due to the attraction of electrons to the lithium cation. This creates positive gas ions due to electron removal from the environmental gas molecules which surround the expanding electric field. Knowing of the existence of the *Endothermic Electric Effect* gives us a different understanding to how an electric field is formed rather than the understanding in today's thinking of Townsend's theory of 'collision'. The *Endothermic Electric Effect* shows the reaction is towards the cation due to attraction and there is order and frictionless charging with respect to time.

Electron attraction to the lithium cations is caused by an attraction force that is greater than the bound force state of the valence bands in the surrounding gas molecules. This must be the case as the only changing parameter in the electric field charge is the increasing ionisation in the lithium caused by the EMF, increasing vibration with respect to time during the charge (for parameters of charge, see table 2).

In turn, as the ionisation increases in USW graph (to what is considered the saturation current in Townsend's collision theory Chapter 7) to voltage pressure, the temperature of the system changes from cooling to warming (2500 seconds USW graph). Now there is an increase in entropy and chaos in the system. The system becomes exothermic, and a temperature increase is seen, the force into the cation is frictional and this signifies resistance losses at the conductor surface making the system exothermic and chaotic. This friction continues until the black arrow in USW graph, from here, with respect to time, there is more ionisation of the lithium occurring

due to the increased vibration of the frictional state caused by continual EMF. This causes more attraction force towards the lithium cations because of increased ionisation, and hence another endothermic reaction in respect to time is observed. There is an increase in electric field volume and a drop in temperature is measured on the surface of the battery, with order restored to the state of the system. As vibration and ionisation continue, the system will again become exothermic and chaotic. Electrons are directed out of the electric field due to collisions. One must remember, the attraction force to the lithium cation is still the factor which causes this electron chaos. The corona [84], power loss is outwards into the environment as-well as frictional resistance at the conductor surface. Electrons move in all directions due to angles of collision with the altered state being chaotic. The fact that breakdown voltages and discharges happen with respect to time is because of the set parameters of a system, the same can be said for energy field gain in a system before breakdown voltages are met. This is supported by temperature observation of the lithium electric field charge with respect to time.

The Endothermic Electric Effect, Stages of Charge

Primary ionisation = endothermic heat gain to electric field

Saturation current reached = exothermic frictional losses from the electric field

Secondary ionisation of metal due to frictional force inwards = endothermic heat gain to electric field

Finally, exothermic saturation of electric field.

12.1 The Newman Energy Machine and Maxwell's Displacement Current

Joseph Newman's Energy Machine produces and benefits in terms of over 100% efficiency due to the displacement current.

This is an endothermic energy generator that can produce more electricity on the output than is imputed as demonstrated by Newman and Naudin. Newman was capturing the displacement current, which is a time dependant reaction. This theory was demonstrated through mathematical symmetry in electromagnetism by James Clerk Maxwell in his work of 1864, *On physical Lines of Force Part 3* [85].

James Clerk Maxwell's work became the foundation of electromagnetic theory by symmetry in mathematical equations and is still contemporary today. The work of Hertz in 1888 confirmed his theory with experimental proof of electromagnetic waves propagated by electric charge [86]. Maxwell's theory was written 40 years before Einstein had written 'The Photoelectric Effect Equation' (5) in 1905. The realisation of what happened to the atoms to create an electric field was not yet complete during Maxwell's lifetime and Neil Bohr's summation of the atom was not until 1915 [86]. The same can be said for the 'Boltzmann's Constant Equation' (7) which was finalised by Planck in 1900 with (1) and (3), again these contemporary laws of physics were established after Maxwell's death. Maxwell unified the laws of Gauss, Faraday and Ampere with the Maxwell-Ampere Law; this law brought

symmetry to the observed mathematical inconsistencies within Maxwell's theory. While Faraday's and Ampere's laws were scientifically correct alone and written from experimental observations; together they showed there was an inconsistency within the equations for the purposes of mathematical symmetry. James Maxwell realised that there needed to be an '*extra current source*', *due to open circuit charging*. By adding the displacement current to the Ampere Law equation, allowed for the inconsistencies within the mathematical formulas to be resolved and he had derived a symmetrical balance and a unifying theory.

Ampère's Law in Matter

$$\nabla \times \mathbf{B} = \mu_o \mathbf{j} + \epsilon_o \mu_o \frac{\partial \mathbf{E}}{\partial t}$$

$$\Rightarrow \frac{1}{\mu_o} \nabla \times \mathbf{B} = \mathbf{j}_f + \mathbf{j}_M + \mathbf{j}_P + \epsilon_o \frac{\partial \mathbf{E}}{\partial t}$$

$$= \mathbf{j}_f + \nabla \times \mathbf{M} + \frac{\partial \mathbf{P}}{\partial t} + \epsilon_o \frac{\partial \mathbf{E}}{\partial t}$$

$$\nabla \times \left(\frac{\mathbf{B}}{\mu_o} - \mathbf{M} \right) = \mathbf{j}_f + \frac{\partial}{\partial t} (\epsilon_o \mathbf{E} + \mathbf{P}) \Rightarrow \nabla \times \mathbf{H} = \mathbf{j}_f + \frac{\partial \mathbf{D}}{\partial t}$$

$\partial \mathbf{D} / \partial t$ is the *displacement current* postulated by Maxwell (1862)

In vacuum	$\mathbf{D} = \epsilon_o \mathbf{E}$	$\partial \mathbf{D} / \partial t = \epsilon_o \partial \mathbf{E} / \partial t$
In matter	$\mathbf{D} = \epsilon_o \epsilon \mathbf{E}$	$\partial \mathbf{D} / \partial t = \epsilon_o \epsilon \partial \mathbf{E} / \partial t$

Displacement current exists throughout space in a changing electric field

Figure 46a: *Maxwell-Ampere law with displacement current*. [86]

Maxwell accustomed this physical displacement current with linear polarization in a dielectric. We can see from Naudin's work; charging a Newman generator is charging an open circuit, and this is a separate process to the discharge of the machine, this being a separate event and after the open circuit charge. This is why the Newman generator charge/discharge is designed with a '*blank spot*' between charge and discharge time. The displacement current is measured in Naudin's work, it is referred to as an '*endothermic cooling*', this is an example of a displacement current measurement. Figures 4, 5 and 6 show how the electric field in this generator is endothermic due to the parameters engaged, it is recognised by temperature and is unequivocal proof of a displacement current measurement in this system.

The displacement current has been an obscure part of electromagnetic theory since its conception by Maxwell, as Daniel M Siegel explores [87]. The displacement current is generated by the ionisation of the atoms of a charging electric field. It has been conceptualised

as a current rippling out from the electric field through the magnetic field which is the essence of an electromagnetic sinusoidal wave through the medium.

The displacement current is detected and measured using temperature difference within the contained experiments of this work; parameters must be engaged to a system to actually measure its existence before a system becomes exothermic. The displacement current is demonstrated to be a part of an expanding endothermic electric field charge with respect to time and seen in figures 10, 27, 35 and most significantly recognised in Home Experiments chapter 11. Figures 38 and 40 of Test 1 and test 2, where the fields' charge is activated with no continuous EMF, only a residual heat put into the battery prior to data collection, with self-charging from atmosphere energy continuing for 22,000 seconds as demonstrated in test 2. In figure 40 you can see how TA reads a lower temperature than T2 from 1250 seconds until the test is stopped. This demonstrates how the displacement current is manufactured from the continuing process of ionisation, with a lower pressure around the electric field due to energy attraction from environment and hence electric field charging. These experiments, test 1 and test 2, ***are direct proofs of a displacement current during an endothermic charge of the lithium battery electric field.***

Where does the Displacement Current Come from?

David J Griffiths [page 323 of 88] states that the displacement current has nothing to do with current except that it adds to \mathbf{J} in Ampere's law, yet this idea does not support the evidence shown in the experiments contained within, as there is direct proof of heat gain from surroundings due to temperature difference shown by the temperature sensors engaged in test 1 and test 2. The displacement current has proved to be difficult to detect, as demonstrated by Bartlett and Corle [89]. G Scheler and G Paulus (2015) state:

'There appears to be hardly any direct, let alone quantitative measurement of the displacement current under lecture-room conditions to the present day.' [90].

The displacement current and magnetic field originate from the induced voltage (ionisation) event caused by an EMF.

The displacement current is part of the overall current and not a current of the magnetic field only. It is a current that originates from the ionisation in the material. The increasing induced voltage in a charging electric field being the result of the 'conduction current' which acts as the EMF, ***and the displacement current*** which is from the material of the atoms and the surrounding environmental gases.

The displacement current is an open circuit displacement current with respect to time and a feature of endothermic charge as-well as exothermic charge.

The displacement current is detectable with constant current applied as shown in experiments, but the system needs to be in an endothermic state to be measurable as a **gain in energy force** to the electric field with respect to time. In the exothermic state there is resistance and losses, measured by rising temperature. The state of the charge force, from endothermic to exothermic, changes due to the amount of ionisation. The displacement current is negligibly small at low frequencies as seen in NASA experiment. In this experiment the temperature drop is under 2

degrees centigrade, and if one applies the Boltzmann-Planck constant (7), it can be seen as a small amount of energy to measure. This is why Newman placed a large EMF with minimum catalyst current into a large coil, an important part of the parameters of the energy machine design. The displacement current is the energy gain from the material atoms of the system (5) (6), as-well as the environmental gases (2) that make up the magnetic field surrounding the system, which have electrons that are attracted and transferred to the expanding electric field with respect to time. Equation 10 shows the formula for the over unity power the Newman machine produces. Maxwell postulates in his 1864 paper, how long conductors of closed loop are a possible answer on how to measure electromotive force in regard to the displacement current. He goes on to postulate how the surrounding gases and molecules are subject to the electric field charging force. Maxwell says,

‘Electrical displacement consists in the opposite electrification of the sides of a molecule or particle of a body which may or may not be accompanied by transmission through the body.’

As we can learn from figures 6, 10, 27, 35, 38 and 40, the displacement current is transmitted through the body of air to the electric field causing a rise in voltage charge within the system, just as Maxwell predicted.

This scenario will cause two actions:

- 1) Electrons will be attracted to the material ions+, as the data confirms, adding to the electron conduction current. The conduction and the displacement current equal the total current, the first in a list of eight equations appearing in Maxwell’s 1864 paper.

$$J_{\text{total}} = J_{\text{conduction}} + \partial D / \partial t \text{ (Total Electric Current) [91]}$$

- 2) The now positive air ion molecule on the periphery of both electric field and magnetic field due to electron loss, one can hypothesise and confirmed by hertz, that this is a reaction that continues the electromagnetic wave propagation outwards through a magnetic field. There is an exchange of electrons through the magnetic field as the wave propagates through the medium. This supports the theory of the propagation of a sinusoidal wave, a changing magnetic field will create a changing electric field and in turn creates a changing magnetic field.

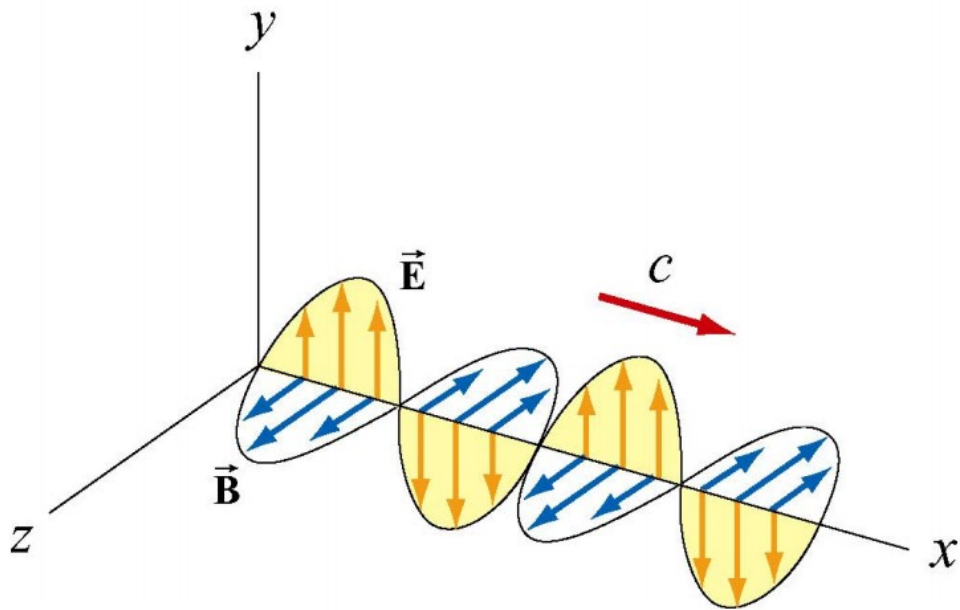


Figure 47: *Propagating electric and magnetic field as a sinusoidal electromagnetic wave travelling away from an EMF event in a system.* [92]

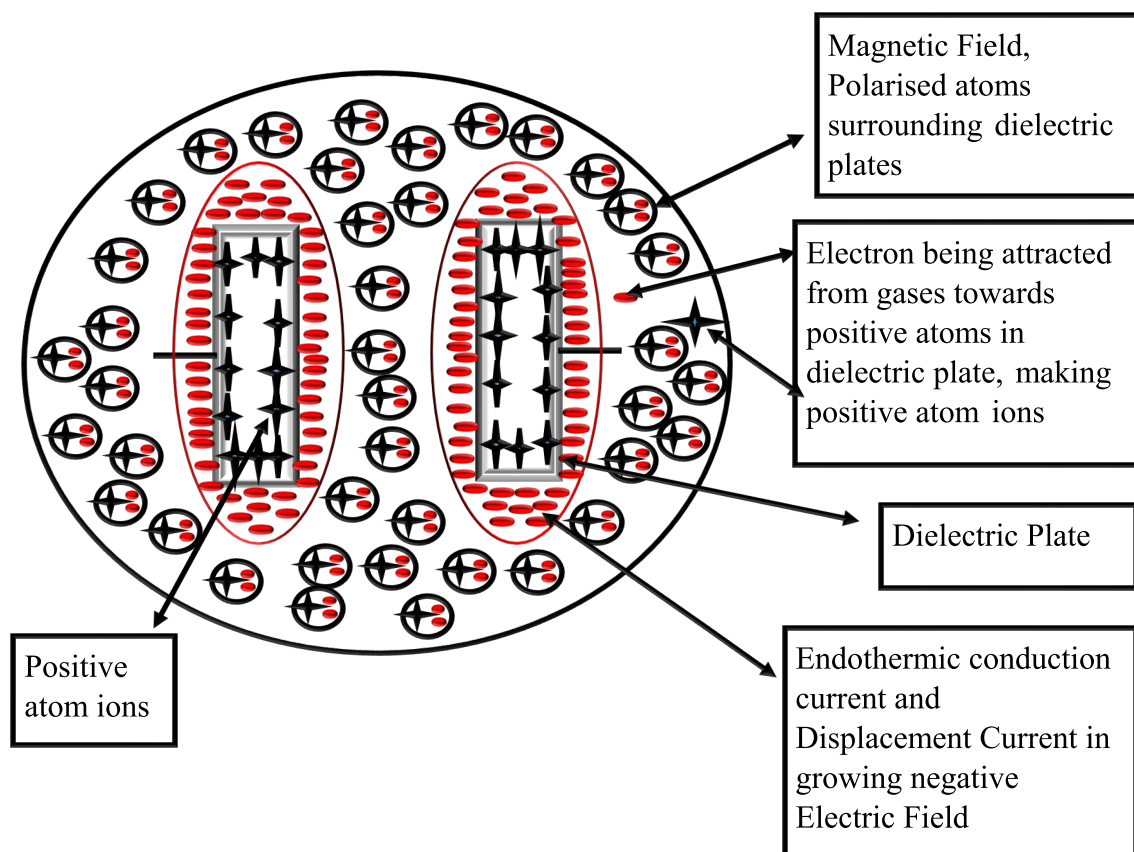


Figure 48: The Magnetic field surrounds an open circuit dielectric electric field charge or battery charge and shows how electrons are manufactured from the material and environmental gases and integrated into the overall current. The result being a displacement current attracted into the electric field with respect to time. Endothermic charge.

Figure 48 demonstrates how a system should be figured and is different to how most textbooks describe and illustrate charge circuit theory. The positive part of the system is throughout the system, but as can be seen, this is not the standard in electronic theory, as demonstrated in figure 49 below.

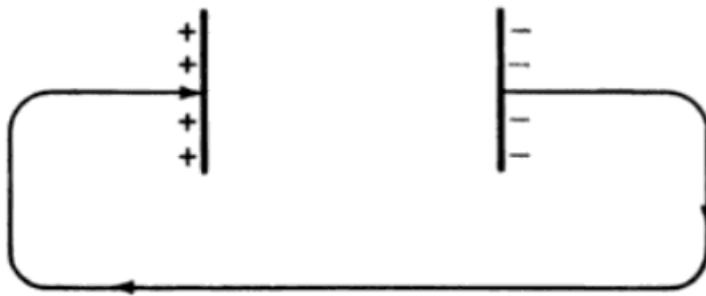


Figure 49: Standard textbook idea of charge in a dielectric. A charge will be attracted across the potential difference of the plates; in reality, the charge is distributed around both plates; this can then be discharged by closing the circuit. The circuit can close itself, known as a short circuit, if too much charge is placed across the dielectric than required for application.

Electric Resistance.

(67) When an electromotive force acts on a conductor it produces a current of electricity through it. This effect is additional to the electric displacement already considered. In solids of complex structure, the relation between the electromotive force and the current depends on their direction through the solid. In isotropic substances, which alone we shall here consider, if ϵ is the specific resistance referred to unit of volume, we may write the

Equations of Electric Resistance,

$$\left. \begin{aligned} P &= -\epsilon p, \\ Q &= -\epsilon q, \\ R &= -\epsilon r. \end{aligned} \right\} \dots \dots \dots (F)$$

Electric Quantity.

(68) Let e represent the quantity of free positive electricity contained in unit of volume at any part of the field, then, since this arises from the electrification of the different parts of the field not neutralizing each other, we may write the

Equation of Free Electricity,

$$e + \frac{df}{dx} + \frac{dg}{dy} + \frac{dh}{dz} = 0. \dots \dots \dots (G)$$

Figure 50: *F and G equations by Maxwell.*

Equation F- does not apply to the endothermic electric field charge, this is the exothermic state of electric field charge in a system due to friction. Maxwell considers resistance as a parameter in a system. It is the way we use a system that causes resistance to become a parameter of energy loss and chaos within a system.

Equation G- expresses the free electricity in an endothermic time charge, the displacement current plus the positive atom ions⁺ force. Maxwell expresses e as free positive electricity in a field. This should read, free negatively charged current in the negative part of the field, outside the positive atoms.

df, dg and dh being the vibrating attractive axis of force of the positive atoms of the electric field.

Maxwell names '*equation G*', 'Free Electricity' (page 485). to capture this 'Free Electricity' has become the holy grail of energy generator inventors since Maxwell identified this displacement.

Patrick J Kelly researched a volume of work showing the search for 'free electricity' [93].

Endothermic Charge Formula

Starting with Einstein's photoelectric effect formula:

$$E_{\text{photon}} = \phi_{\text{ion}} + \text{KE}_{\text{electron}}$$

$$h\nu = \phi + \text{K.E.} \quad (5)$$

substitute this into the battery system format,

$$h\nu = \text{EMF input} = \text{force}$$

$$\text{The work done } \phi_{\text{ion}} = \phi_{\text{ion}}^+$$

$$\text{KE}_{\text{electron}} = e^-$$

$$\text{Force} = \text{Li}^+ + e^- \quad (6)$$

Li^+ = positively charged lithium atom ion

e^- = negatively charged lithium electron

Force = EMF input

$$\text{Total Current} = e^- + \text{EMF electron} + e^- \quad (8)$$

$$\text{Total electron current} = I_{e^-} \text{ total} = (a + b + c)$$

a) KE electron = e^- = Electrons from material atoms

b) environmental electrons e^- = Electrons from environment gases

c) EMF electrons = Electrons from supply EMF current (conduction current)

There are 2 components which represent the energy gain whilst endothermic, which in turn represents the displacement current.

a) system electrons e^- = Electrons from material atoms

b) environmental electrons e^- = Electrons from environment gases

$$\text{Total electron displacement current} = I_{De^-} = \text{total} = a + b \quad (9)$$

Displacement Current Explanation

You could accredit Maxwell the discovery of 'The Endothermic Electric Effect' by conceiving 'The Maxwell-Ampere Law'. An electric field charge is first endothermic then exothermic, although electricity theory has only ever been thought of as a resistive and exothermic reaction. This is something Maxwell could not know at the time of writing his mathematical theory work. No experiment had been devised to analyse the temperature changes of a charging electric field with respect to time, which identifies how this displacement current behaves within a charging system. Maxwell had the genius to deduce through mathematical symmetry there was another current other than the conducting current. Maxwell wrote 'equation F' explaining his understanding of *resistance in electricity*. Equation G is the equation of no resistance with an energy gain for free, hence Maxwell named it *free electricity*!

Critical Parameters of an endothermic system:

1. Time.
2. EMF input = voltage and ampere applied (the conduction current under pressure).

The result is a rising voltage: = Increasing frequency of vibration of the now multiplying ionising atoms, this is a direct result of Faraday's law, this causes a monopole EMF outward, attracting electrons, its opposite monopole, from the material and environment.

3. Surface area of system.
4. Density and conductivity of atom material.

It is the Photoelectric Effect equation (5), an EMF input that induces an electric field by dislodging electrons from the atoms of the system, a catalyst to the displacement current, and causes an 'Endothermic Electric Effect'. Due to this, electrons are attracted towards the atom ions of the conductor, from the surrounding environmental gases of the expanding magnetic field surrounding the expanding electric field, these electrons are part of the displacement current. The expanding magnetic field, which is made of gas atoms and molecules, are subject to a torque on their rotating dipoles. This alignment of rotating dipoles will exert a torque of their own around the accelerating electric field. There is an inward force to the centre of the electric field, this is due to a high to low pressure gradient and is due to the removal of heat into the accelerating electric field with respect to time. In the Swansea experiment the drop in temperature was measured 17cm from the battery when the EMF was engaged, indicating a displacement current from *at least this distance* from the accelerating electric field.

Has Evidence Corroborated Theory?

Yes, and to summarise this we have:

1. Naudin demonstrates endothermic cooling on coil of Newman generator. Showing that the Newman generator produces the displacement current with respect to time with no resistance in the system. Chapter 3
2. Chih's Endothermic plateaus in alloy metal increases efficiency in salts. Chapter 8
3. NASA endothermic cooling. A comprehensive experiment due to the system designed. Chapter 4
4. USW experiments show endothermic gain. This experiment shows different amounts of endothermic gains to the system because of temperature difference in the system at the start of the different experiments. Chapter 9
5. Swansea experiment - endothermic reaction seen in experiment from at least 17 cm from the battery. Chapter 10
6. Home experiments chapter 11 show displacement current turned into rising voltage in battery.
7. The Earth atmosphere charges endothermically as well as exothermically. Chapter 5
8. Self-charging graphene battery. The Photoelectric Effect. Chapter 19.2
9. National Grid recognise endothermic reaction. Chapter 6

13 Endothermic Electric Effect EMF Output Equation

For an Endothermic Energy Generator

This is a parameter-controlled charge and discharge with respect to time.

$$\text{EMF}_{\text{output power}} = \phi_{\text{ion}^+} \times I_{\text{e-total}} \quad (10)$$

$$\text{Total electron current} = I_{\text{e-total}} = (a + b + c)$$

- a) system electrons e^- = Electrons from material atoms
- b) environmental electrons e^- = Electrons from environment gases
- c) supply electrons e^- = Electrons from supply EMF current

There are 2 components which represent the energy gain,

- a) system electrons e^- = Electrons from material atoms
- b) environmental electrons e^- = Electrons from environment gases

The gain in the system is produced due to Einstein's Photoelectric effect equation (5), taking place, and Maxwell's pursuing displacement current gain into the negative electric field of the system.

14 Endothermic to Exothermic Electricity

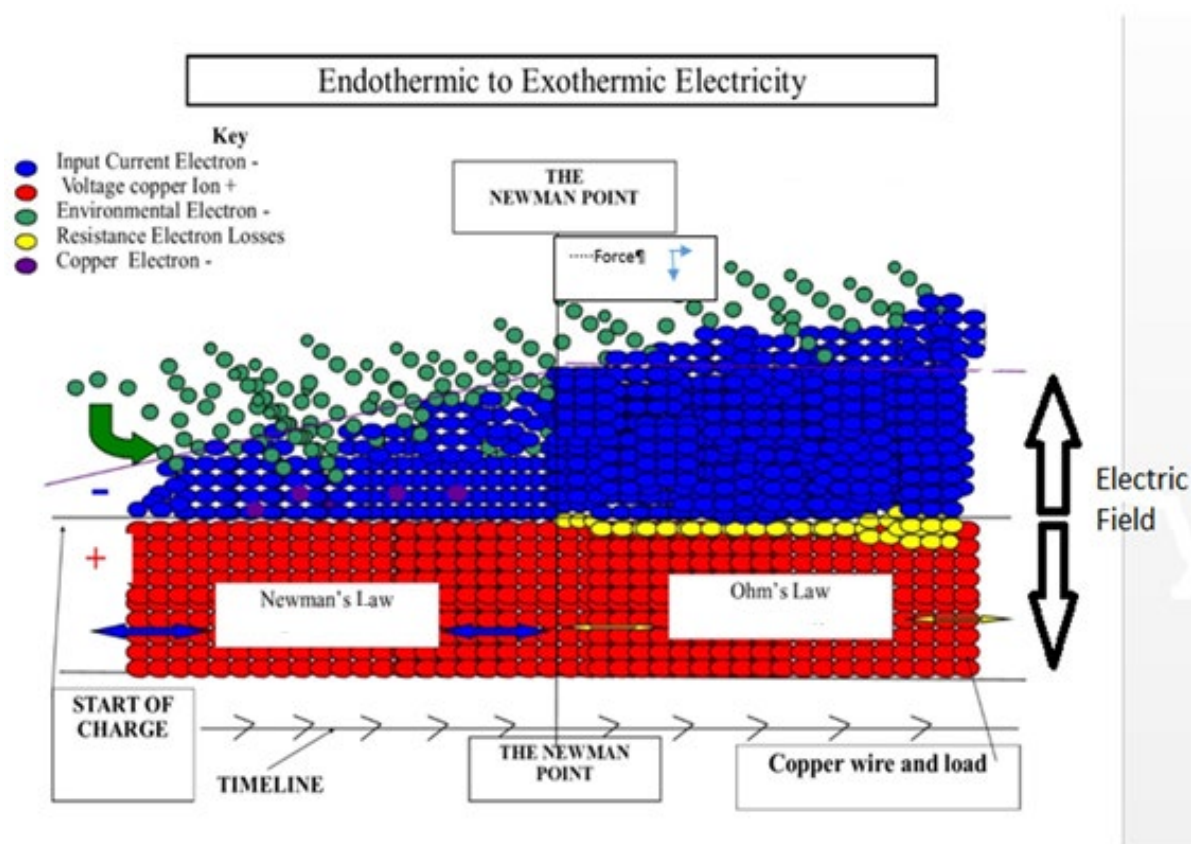


Figure 51: Endothermic to Exothermic reaction in a copper wire

$$\text{Newman's Law} = \text{EMF output} = V \times I(X) \quad \text{Endothermic (11)}$$

$$\text{Ohm's Law or impedance } Z = \text{Exothermic (12)}$$

(X) = Heat gain coefficient constant for a specific design of a specific system.

The Newman Point

At the start of an electric field charge, a '*force in*' is applied. This force applied can be administered to a system in a variety of ways, for example, light, wind power, steam pressure, electrical force, etc. The EMF is a catalyst to a *force out of the atom ions*, this is the Photoelectric Effect taking place, and repulsion and attraction forces now dominating the state of the system. The *force in* is the current attracted to the positive atoms of the wire. The negative part of the electric field will continue to grow with order and equidistant spacing of charge carriers within the field due to like repulsion and will eventually equal the joules *force out* of the atom ions. This, I have named The Newman Point.

'**The Newman Point**', is the *point in time* of an electric field charge when the negative current field, *force in*, equals the atom ions *force out*. This is the *point in time* during the electric field

charge before any frictional forces are introduced, the system is balanced, and the electric field is charged above 100% efficiency. The circuit of electric field charge is completed within the system.

After the *Newman Point*, if more current is placed into the system, resistance is met. This is by an invasion of *force in* (current) into the atom ions.

Newman's law

There will be no resistance in an electric field charge, until the electric field current has a greater *force in* than the positive atom ions *force out* of the system.

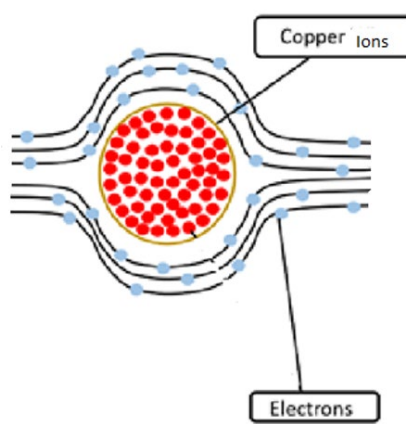


Figure 52: Represents the endothermic equation, the electric field current growth stage, '*force in*' is less than '*force out*.'

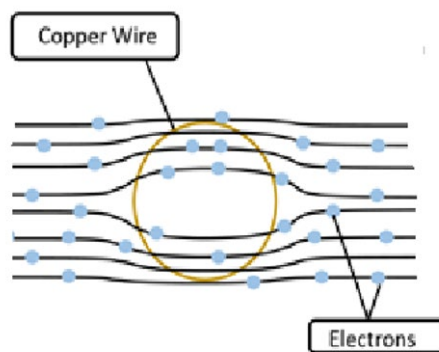


Figure 53: Represents the exothermic equation, the *force in* is greater than the *force out*, this is the electric field current invading the positive atom ions causing frictional force, this occurs after the *Newman Point*.

15 1st Law of Thermodynamics for an Endothermic Generator

Considering the Endothermic Electric Effect, an Endothermic Generator will obey 'The first law of thermodynamics', which is the application of the 'conservation of energy' process in an open system. An Endothermic Generator has a different parameter set to an exothermic generator; the 1st law shall be written as:

The change in internal energy on the output of the system is equal to the heat added to the system plus the work done to the system.

$$\Delta (\text{EMF output}) = Q + W$$

$$\text{Change in Internal Energy on output} = \text{Heat added} + \text{work done}$$

This formula is now the application of the 'conservation of energy' considering that it is an open system and the Endothermic Electric Effect.

The 'conservation of energy' law is not violated during the endothermic reaction; it is an open system. The Endothermic Electric Effect is a stage of the electric field that is fact and can be exploited for energy generation purposes.

The result is:

$$U (\text{EMF output}) = >1 \quad (13)$$

This is because internal energy now has energy from the systems material in the form of electrons, and environmental electrons attracted and stored in the negative current field. The endothermic generator system is discharged before any exothermic losses caused by frictional forces have occurred.

This agrees with the conservation of energy and laws of physics, Einstein wrote:

$$h \nu = \phi + \text{K.E.}$$

$$E_{\text{photon}} = \phi_{\text{ion}} + \text{KE}_{\text{electron}}$$

Considering the Endothermic Electric Effect, we have:

$$\text{EMF}_{\text{output power}} = \phi_{\text{ion}^+} \times I_{\text{e}^- \text{ total}} \quad (10)$$

16. Why an Endothermic Generator is a river of Energy in a Magnetic Field

When an EMF is placed upon an Endothermic Generator, a lower air pressure is developed around the electric field due to the '*Endothermic Electric Effect*'. This allows for the induced magnetic field surrounding the electric field to exert an inward force and pressure on the electric field. There is a reduced pressure surrounding the electric field due to the removal of energy in the form of electrons and these electrons are attracted into the electric field. Therefore, the direction of force is INWARD due to the higher pressure which surrounds the endothermic electric field. There will be a continuous supply of energy from the induced magnetic field BECAUSE OF THIS PRESSURE GRADIENT (see NASA experiment). In addition to this, an Endothermic Generator has an orderly expanding electric field with no frictional losses as there are NO COLLISIONS BETWEEN ELECTRONS AND IONS. This means that the induced '*Endothermic Electric Effect*' has no recombination of ions and electrons during the endothermic time parameter. Separation of charge is maintained and therefore the Endothermic Generator current discharge will benefit from:

- a) electron mass from the system material
- b) electrons from the environmental gaseous surroundings

Mathematical Projection

Ionising 1Kilogram of copper with an endothermic generator.

$$\text{Number of atoms} = \frac{1 \text{ Kg}}{\text{molar mass}} = \frac{1000}{63.55}$$

$$= 15.73 \times 6.022 \times 10^{23} \text{ (Avogadro number)}$$

$$= 9.472606 \times 10^{24} \text{ ionised atoms in 1 kg of copper}$$

Number of ionised atoms = number of electrons expelled into electric field

$$= 9.472606 \times 10^{24} \text{ electrons}$$

$$\text{Divide this by charge of 1 coulomb} = \frac{9.472606 \times 10^{24}}{6.24 \times 10^{18}}$$

$$= \underline{1.52 \times 10^6 \text{ coulombs x time}}$$

$$\text{energy gain} = 1.52 \times 10^6 \text{ coulombs} + \text{endothermic environmental electrons (x time)}$$

- This is a renewable energy machine accessing energy from the system design and the environment it is placed in.
- The Endothermic Electric Effect seen in USW graph can be up to 80% of the SOC (table 3) of the electric field charge.
- Endothermic Generators can be coupled with existing technologies.
- Power can be harnessed in all types of environments.
- The scale of the machine can be built as required, for different types of applications.
- Energy can be placed onto any type of energy grid.
- Space travel applications.

Electricity as we know it, has been understood as an exothermic reaction only, this is because of our past observations. Over the last 200 years we have built our understanding of electricity through our observations of this type of reaction. Our physics understandings of thermodynamics and entropy have been considered and interpreted by the understandings introduced by Faraday, Ampere, Gauss, Maxwell, Boltzmann, Wien, Max Planck, Einstein, Ohm, Tesla, and others. The second law of thermodynamics has not been compromised in an Endothermic Generator. The ingenuity of the design uses this law repeatedly to gain excess energy from the displacement current on the output compared to the input. The system is benefitting from the second law of thermodynamics energy flow, high pressure to low pressure continually with the added design, **‘with respect to time’**. This is all made possible due to the very foundation of electromagnetism, **opposites attract and likes repel**.

P.W. Bridgman, winner of the Nobel Prize in 1946 stated in his work.

‘The Nature of Thermodynamics’ [94, page 22]

“I believe that many physicists honestly do not know whether or not to think that a sufficiently ingenious combination of means now in our control might violate the second law on a commercially profitable scale. Thermodynamics gives me two strong impressions: first of a subject not yet complete or at least of one whose ultimate possibilities have not yet been explored, so that perhaps there will still be further generalizations awaiting discovery; and secondly and even more strongly as a subject whose fundamental and elementary operation have never been subject to an adequate analysis”.

This is quite a remarkable insight, yet the 2nd law does not need to be violated to be a ‘commercially profitable scale.’ Showing us that we are further along the road to analysing and understanding how systems *obey thermodynamics*. It was Newman who opened the door to this ‘ingenious combination of means’, to use the unshakeable 2nd law to his advantage. Excellent insight and questioning by Nobel prize winner P.W. Bridgman who dedicated his life’s work to physics.

Presented here in this research, is a branch of electricity physics I have named ‘Endothermic Electricity’. The 2nd law of thermodynamics, as P.W. Bridgman said, had not been subject to an adequate analysis, or interpretation through energy generation possibilities. This phenomenon has been demonstrated as a ‘new’ renewable energy generation possibility, and the start of a new energy exploration. We can draw conclusions by opposite effect such as:

Exothermic Electricity	Endothermic Electricity
Energy Losses	Energy Gains
Chaos in the system	Order in system
Rising Temperature in system	Lowering of Temperature in system

(Every system has to be analysed for its own traits, and these opposite effects are not always the observation, as shown by Chih chapter 8.)

17 How Faraday's Law and Maxwell's Equations apply to Endothermic Electricity.

A quote from the Faraday institute:

Faraday's advice to a younger scientist to 'Work, finish, publish', is an aphorism that would serve as a useful reminder on the wall of any modern laboratory.

It is well documented in science history that Michael Faraday [95] was the discoverer of how an electric current will flow in a changing magnetic field. The changing magnetic field is separate from the growing electric field, it is the force used to ionise the atoms. When one is talking about endothermic energy generation one must understand the process required to expand an electric field without the reaction becoming exothermic. It is an open circuit charge. Initiating an EMF causes induced ionisation which is established in the surface area of the conductor by the force of the magnet, dislodging electrons from the outer valence bands of the atoms, and thus the photoelectric effect is induced (5) (6). This dislodgement of electrons is caused by the force bouncing back out of the atom sphere. This creates a negative current field that will surround the positive conductor and the electrons will be attracted to the conductor due to opposites attract law, the very fundamental reaction of electromagnetism. The field must be stopped and discharged before any exothermic reaction takes place to benefit from the displacement current. Newman dedicates a chapter to gyroscopic action in 'The Energy Machine', describing the nature of attraction and repulsion and the mechanical nature of electromagnetism. Maxwell based his mathematical symmetry of electromagnetism on mechanical interaction, using Ampere, Faraday, and gauss's experimental observations.

As we know, a changing magnetic field will induce an electric field which will in turn induce a magnetic field around the charging electric field due to the 'Endothermic Electric Effect.' Not only will the fixed lattice positive ion atoms in the sphere of the conductor attract the negative electron current field from the material, but it will also attract electrons from the environment. The positive vibration outward and negative current inward will have spins as depicted.

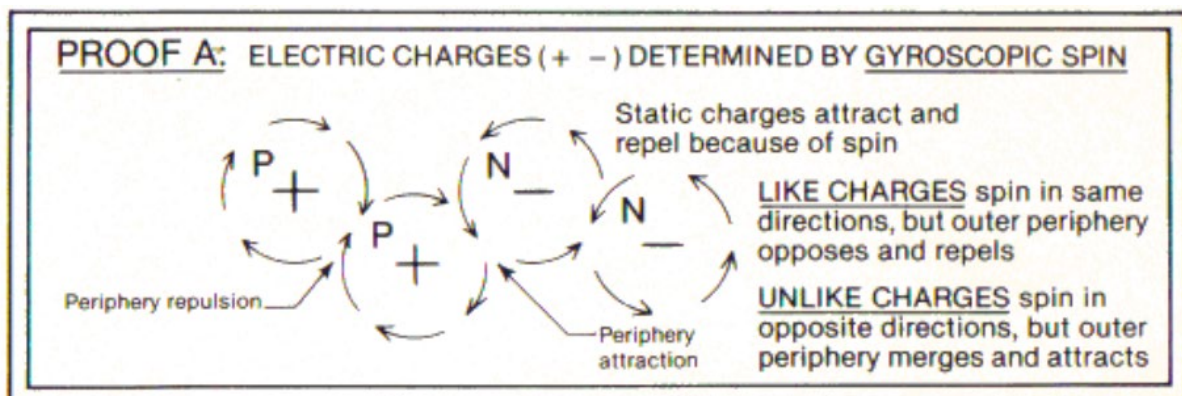


Figure 54: Attraction and repulsion demonstrated by Newman in his book, this diagram shows the spin of particles and how attraction and repulsion interact at the periphery in a mechanical way due to gyroscopic rotation.

The Photoelectric effect; to the Endothermic Electric effect; are the 1st two stages of an expanding electric field charge.

Friction

The reaction becomes exothermic due to friction. The study of friction proves that heat release is the result of surface compression of the two operators involved, in this case it is electrons and positive ions. The coefficient of friction is defined as the ratio between two quantities – increasing pressure, thus contact pressure is increased until friction is achieved. This is excessive *force into* the positive atom ions⁺, compared to *force out* from the positive ions of the conductor.

Mechanical Action

The electron is NOT free to move at ‘will’ or ‘randomly’ in a conductor, it is controlled by the attraction force, and this is due to gyroscopic spin. Movement of electrons is outside of the wire or plate and is directed towards the conductor and load. This mechanical interaction will attract electrons into the electric field. This is the first reaction after a separation of charge in an atom which is a direct reaction caused by the force of the magnet which acts as an EMF input, and this is the catalyst to the reaction in Faraday’s law.

The atom{s} ions will vibrate to a certain frequency due to the continuous impact force of a changing magnetic field, this is a direct result of the magnet’s EMF, and electrons are detached from the atom{s} last available energy level. The atom has altered from its original neutral state and become electrically charged. The initial inward force applied to what becomes an electric field system experiences Newtonian mechanics when confronted with a solid lattice.

For example:

If one is to introduce a force at a 90 degrees angle to the conductor, the vibrational force will bounce back in the same direction it came from. Depending on how malleable the surface is and how big the inward force is, will govern the depth of vibrational penetration into the material. In other words, the force transferred will depend on the density of the metal lattice and the force applied, these are two parameters encountered in the *Photoelectric Effect* reaction. The newton force is usually described in volts/meters or can be newton /meters or joules, -with respect to time. This reaction ionises atoms due to the impact of two objects, it is a mechanical process, starting a vibration through the system, and an electron bond is broken from the atom and removed to what we term as the negative part of a growing electric field with respect to time. This is how an electric field of positive and negative opposite charge attraction is established and is an example of mass into kinetic energy. The definition of kinetic energy is the measure of the work an object can do by the virtue of its motion. [96]

There is no mass assigned in coulombs equation (4), yet we can equate force with charge by using:

$$ke = \frac{1}{2}mv^2 \quad (14)$$

We assign the same charge to an atom ion as to an electron, (figure 17a). One must assume this is charge per unit area of the mass. Therefore, the vibrational force or kinetic energy is much larger within the atom ion+ compared to the detached electron simply because of the mass of the object.

Therefore, examining kinetic energy force:

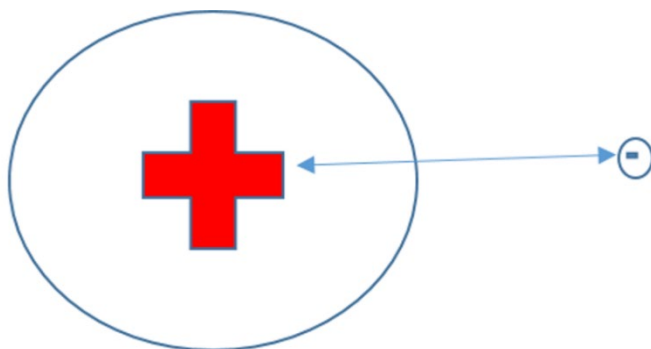
A positive atom ion we have: The mass of the copper ion is: $=1.0 \times 10^{-25}$ kg.

An electron we have: The mass of an electron is: $=9.1094 \times 10^{-31}$ kg.

This equates to a mass difference of approximately one million units. We can designate a velocity to the system:

“For an electron gun with a voltage between its cathode and anode of $V = 100V$ the electron will have a speed of about $v = 6 \times 10^6$ m/s. (Relativistic effects have not been considered.) There will be no more acceleration once the electrons have passed through the anode.” [96]

This tells us that the kinetic energy force of the atom ion is dominant in the reaction and shows us the endothermic gain is due to the **imbalance in attractive force between the two operators**. This force allows the atom ion to attract a very big number of electrons before any friction by force is seen or measured on the atom ion+. This is why an electric field charge has an energy charge displacement current and the system can show a cooling effect around it, the atom ion simply attracts electron energy from the surroundings due its dominating attractive mass size force, which in turn has more kinetic energy, causing an endothermic attraction reaction.



Not to scale

Figure 55: An atom ion has a diameter around 1850 times bigger than the electron [97,98]

The $h\nu$ or photon in the Photoelectric effect equation 5, is the electricity equivalent terminology to the EMF placed into the system, this is the catalyst to the energy conversion, and as we

know, the 1st law of thermodynamics - the conservation of energy applies, and attraction and repulsion forces apply. Energy is conserved within the electric field, with both the atom and the electron now having some transferred energy. Atoms in a metal structure need a certain amount of 'energy' to dislodge the outer electrons from the metal atoms in the lattice and induce an altered state. It can be seen that the initial pressure or *force into* the conducting system will cause a certain number of electrons to be removed from the atoms of the lattice and a positive and negative charge is achieved in the system. The 2 operators required for an electric field to be a force to do work is established.

17.1 Faraday's Law

The rotating magnet in an energy generator will continually exert a force on the negative current field, this is known as the Hall Effect [99]. A sinusoidal wave is observed due to the negative current being repulsed by the magnet and attracted to the conductor, flowing from high to low pressure around the coil which will have a lower pressure per unit area at 90 degrees *from* the striking point compared to *the striking point of the magnet*. The positive coil of wire acts as the lowest pressure area in an electricity generator system at closing of the switch due to, high to low pressure gradient from the magnetic field directed towards the electric field.

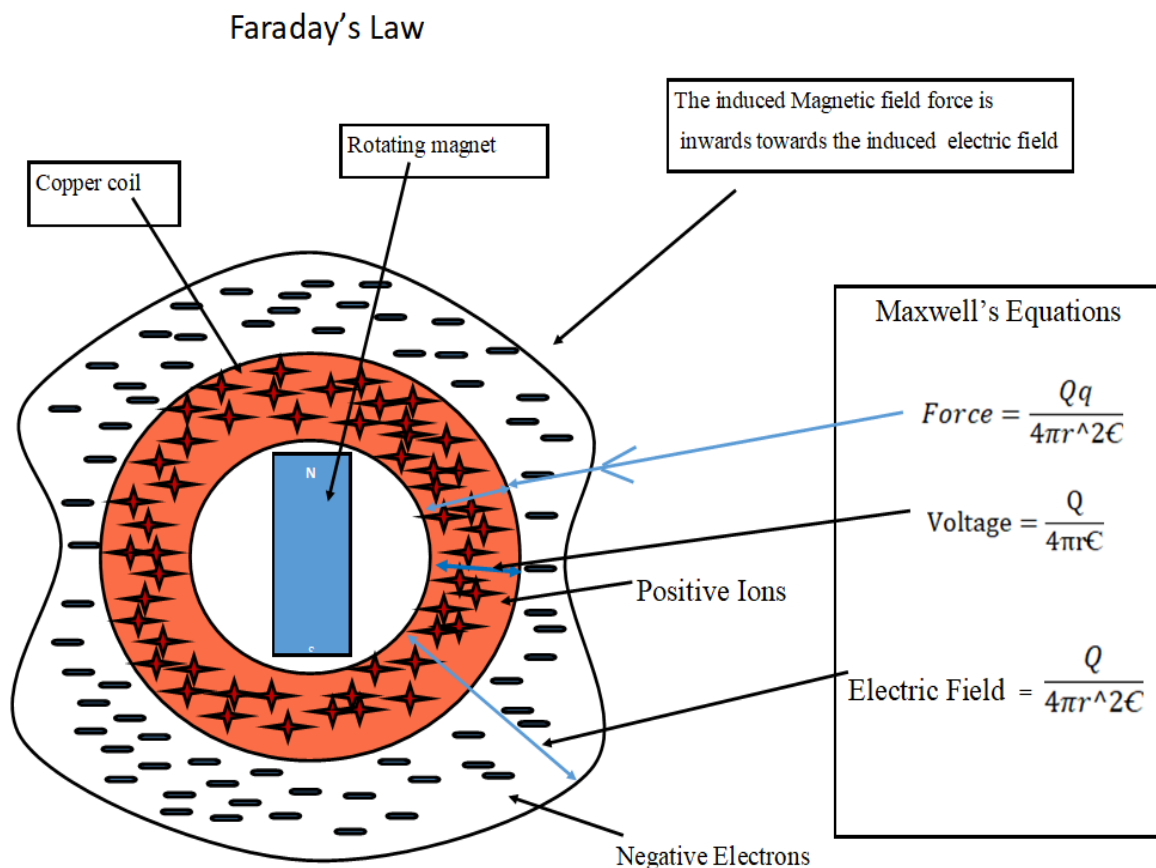


Figure 56: *Faraday's Law Diagram, A changing magnetic field (the Magnet) will induce a growing endothermic electric field, which induces a magnetic field around the electric field.*

Question 1. How does a current flow in a changing magnetic Field?

Answer. A changing magnetic field induces a current to flow in a conductor because the magnet induces the Photoelectric Effect in the coil, equations (5) and (6). The force of the magnetic field of the magnet and the attractive force between the induced positive and negative of the electric field, create a push and pull effect on the negative part of the electric field with respect to the surface of the conductor around the coil, seen as a sinusoidal wave.

Question 2. Why does there have to be a closed loop of wire?

Answer. The closed loop of wire acts as a load, a pathway, and attracts the current due to ionisation, which allows the higher pressure of the negative current at the striking point of the magnet to move to a lower pressure along the loop. The current flow is from the striking point of the magnet to 90° from the striking point of the magnet or in other words, to the lower pressure area of the system. The endothermic electric effect reaction will continue until the circuit is completed, after this, frictional force on the conductor ions + will cause an exothermic reaction and resistance losses to the system.

Question 3. Where does the induced current reside?

Answer. The induced current is negative and is only one half of an electric field. It resides outside the positive atom ions of the wire.

Question 4. How does a current appear around a wire?

Answer. Electrons are expelled out of the atoms of the wire. Electrons from the surrounding gases of the environment are attracted to the positive atom ions of the wire. A negative electron current field is induced by the EMF input causing electron displacement from the material atoms. A negative electron current field is an inward attractive force towards the positive atom ions of the wire. The direction of flow is from high to low pressure along the circuit loop, the 2nd law of thermodynamics applies with an endothermic charge.

17.1.1 Maxwell's Equations

We understand electromagnetic theory by using James Maxwell's mathematical equations, which unified the theories of Gauss, Faraday and Ampere.

Maxwell said at his inaugural speech to Kings College,

'You must apply the principal of electricity to the formula written.'

Force Equation

$$Force = \frac{Qq}{4\pi r^2 \epsilon} \quad (15)$$

Q = A positive ions [+] [Q] attractive *force out* of the sphere

q = A negative [-] [q] current attractive *force in* to the sphere.

$4\pi r^2 \epsilon$ = Surface area of the induced electromagnetic field multiplied by the permittivity of free space.

Using this equation in endothermic state of charge it identifies the following:

- There is an induced magnetic field around the induced electric field of the wire created by the EMF of the magnet.
- As seen in figure 56, *Faraday's Law*, the force is inward to the electric field. And q^- can have 3 components: supply electrons, material electrons, and attracted gaseous electrons. These 3 components are the conduction current and the displacement current.
- The Permittivity of free space relates to the whole affected area of the electromagnetic field of force.

Voltage Equation

$$\text{Voltage} = \frac{Q}{4\pi r^2 \epsilon} \quad (16)$$

This equation expresses and identifies:

- I. One of the operators of electricity, Positive atom ion charge that attracts negative charge to an equilibrium.
- II. The surface area of the conductor sphere
- III. Permittivity of free space

Electric field

$$\text{Electric Field} = \frac{Q}{4\pi r^2 \epsilon} \quad (17)$$

You will notice that there is only one charge symbol Q in this equation. Maxwell has expressed an electric field as ' Q ' only, it is an open voltage equation, with no current flow. This is equilibrium and equivalent to no friction, 'The Newman Point' in a charging electric field.

18. Summary of the Charge Cycle of the Electric Field

Due to the Photoelectric Effect, electrons are expelled out of the atoms of the material which is used to build the system. Electrons from the surrounding gases of the environment are attracted to the positive atom ions. A negative electron current field is attracted and is an inward attractive force towards the positive atom ions.

1. The $\phi \text{ ion}^+$ of the electric field gains joules energy due to input force, and more atom ions are produced with respect to time due to continual force. This raised state of energy will give a higher vibrational state to the electric field ions in the material lattice.
2. The drop in temperature shown in experiments, figures 27, 35, means there is a heat energy gain into the system from the surrounding environment. The attraction force of $\phi \text{ ion}^+$ of the electric field will influence other atoms and molecules in its area of force influence, this is how a magnetic field is aligned around the electric field. A magnetic field of atoms and molecules will align their dipoles to the electric field's polarity.

During the electric field charge, there is a repeatable pattern of different states of force, and imbalance. The $\phi \text{ ion}^+$ of the electric field dominates the electrons in the initial growing of the electric field as it attracts the electrons towards its mass. This attraction of positive and negative is continued throughout the time of charge and results in different vibrational states:

1. Initially there is an energy gain, with higher vibration of $\phi \text{ ion}^+$
2. The force between the two operators will become an equilibrium state, between $\phi \text{ ion}^+$ and e^- on the crossover from endothermic to exothermic. Which I have named, *The Newman Point*.
3. A frictional force in the electric field will be the next action. This can be recognised by a temperature rise in the system, an exothermic reaction, this is where historical and conventional understanding of an electrical system is seen. This is because of inward frictional force to the material $\phi \text{ ions}^+$ causing chaos and energy losses.
4. There is again another endothermic heat energy gain due to more $\phi \text{ ions}^+$. The ions are produced due to rising pressure caused by frictional force of the negative current field to the atom ions. This is due to attraction by the $\phi \text{ ions}$.
5. Finally, there is a higher vibration of $\phi \text{ ions}^+$ and higher vibration of e^- , the final state of charge with continuous force will be exothermic.

19 Background Research Extension Work.

19.1 A study into high voltage Transmission Lines

A study into high powered systems was carried out by F.W.Peek [100] and was presented at the 28th Annual Convention of the A. I. E. E., Chicago, June 26-30, 1911. On page 1486 Peek states:

“In alternating-current transmission lines at very high voltages a loss occurs by dissipation of power into the air. This is accompanied by luminosity of the air surrounding the line conductor—the so-called corona. Loss begins at some critical voltage, which depends on the size and spacing of line conductors, etc., and increases very rapidly above this voltage.”

Here Peek states how there are power losses in the transmission lines beginning at some critical voltage. Time was only used as a time length of the experiment and not a critical parameter to compare different states of the corona at different applied voltage in respect to time. A changing temperature within the surroundings of the system during the reaction was not considered, and not seen as an important factor in what could be happening during the reaction.

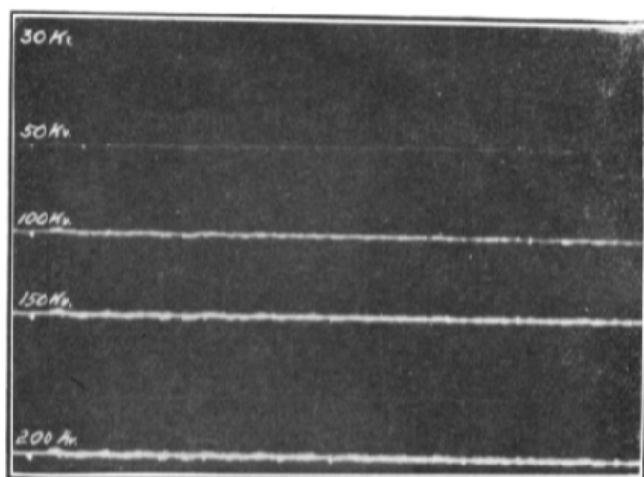


FIG. 43.—Phosphor bronze bright tinned wire. Diameter .051 cm.

Figure 57: Peek's fig 43, page 1542 *Photographic Study*. The chaos and entropy are captured by applying parameters, the more exothermic chaos introduced shows how harmonic frequencies increase and become visible to the human eye.

Peek's Description: *“A photographic study of corona on wires and cables was made as follows: Two parallel conductors were spaced 122 cm. between centres. The camera was focused on one conductor only. The distance to the lens was such as to show the conductors at approximately actual size. An exposure was made for a given time at a given voltage. The plate was then shifted slightly, the voltage was raised, and an exposure made for the same time. That*

is, a given series shows the same part of the same single wire at different voltages. This operation was repeated until the series for a given wire was complete."

From these experiments, formulae were developed by Peek and Whitehead which has become a reliable guide to the engineer in designing transmission lines so that loss of power in corona effects could be reduced. The formulae developed is used to plot power losses from the conductors over increasing voltages. Temperature and pressure are part of this formulae. The remarkable observation here is that the plotted curves shown by Peek's fig 3 page 1489, (figure 58), demonstrate no losses from the system until a critical voltage is reached, which is always below the visual corona voltage.

Peek observed this:

Page 1534

"The voltage for small striking distances is higher than "theory" would warrant. This seems to be because a certain finite amount of energy must be stored in the dielectric about the point of discharge or, in other words, the voltage must be raised sufficiently above the "theoretical" voltage in order to extend the rupturing gradient over a finite distance."

This observation by Peek that a certain voltage will give rise to a certain size envelope of electric field in the air around the positive conductor, before a disruptive discharge is measured. When the critical voltage is reached the system enters a chaotic state of stress where the expanded field is exothermic due to friction on the conductor. By using smaller size diameter wire, gives rise to chaos at lower voltages. This being due to the repulsion of the like charges of the electrons squeezing electric field intensity flux lines ever closer together culminating in more entropy and disruptive discharges. The corona or half the electric field surrounding the conductor becomes visible due to frequency change within the chaotic field at the visual critical voltage.

Kolcio et al 1969 [101] reported bad weather in the form of rain revealed an almost doubling in losses to the corona effect. It was observed how air density, rainstorms and sleet would change the parameters that would influence critical voltage reactions. Bad weather would increase the air density in the form of water droplets, culminating in more available kinetic energy in the environment surrounding the transmission lines. Peek's experiments resulted in showing that these discharges can be diminished if the conductors of the transmission lines were placed further apart. Another observation would show that the reaction would also continue to discharge if the conductor voltages were increased, and the conductor bundles were placed at further distances from each other. Kolcio states page 1346:

"However, corona loss and the relationship between gradient and corona loss cannot be very accurately described analytically for bundled conductors although there have been some efforts toward that end."

Cassius M. Davis [102] states on page 2337:

"The general mechanism of corona formation may be described as follows: Upon the gradual increase of the applied voltage a value is reached which gives, at the conductor surface, a

potential gradient sufficient to break down the air. In this way the air becomes conducting as far from the conductor as the gradient exceeds the breakdown value.”

Davis goes on to explain how in the case of conductors placed in parallel proximity, the corona formation can be extended or discharged between conductors by altering critical parameters; the applied voltage; distance between conductors or surface area of the conductor are all important parameters.

Dr Whitehead and Peek are both commended for their accurate experimental techniques and resultant findings.

Harris J. Ryan states page 2344 of [102],

“In the present papers we have placed before us conclusive evidence that corona starts to cover a round conductor in the open when the normal air is stressed to 30 kv. per cm. at a distance of $a = 0.301 \sqrt{V r}$ cm. radially from the conductor surface.”

Mr Davis also shows in his experiments there is also observations of corona manufacture at lower voltages when the spark gap is reduced; conductor diameter; air density; time of corona formation to discharge are all probable factors. Peek agreed that parameters are a factor to corona size and discharge. Peek says [100] on page 1448:

“If the conductors could be made perfect no loss would occur below the visual critical voltage. However, at low values of corona, two effects occur, which cause a deviation of the loss from the quadratic law (Peek’s equation 1), and which affects the loss in opposite directions:

a) The loss of power does not begin at the voltage e_0 at which the disruptive gradient is reached at the conductor surface, but only after the disruptive strength of air has been exceeded over a finite and appreciable distance from the conductor, that is, at a higher voltage”.

Peek further demonstrates how the law of corona follows the quadratic law [100]. On page 1011 he writes:

“In the early work it was stated that with a polished conductor, no loss would be expected below the visual critical voltage e_v . It was further stated that the loss should then start quite suddenly and follow the quadratic law.

The measurements by the cathode ray oscillography are thus quite in agreement with laws formulated in the former work as follows:

- a) At the visual critical voltage and above, corona loss follows the quadratic law over a wide voltage range, or, $p = k (e - e_0)^2$*
- b) There is no loss below e_v for polished wires.”*

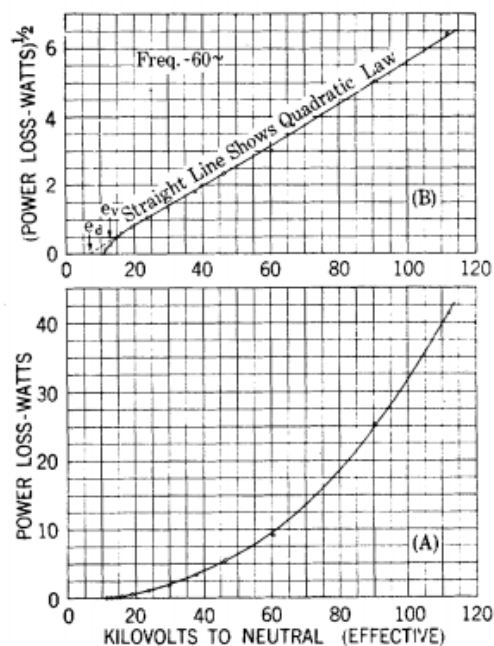


FIG. 3—OBSERVED CORONA LOSS

Measured by means of the cathode ray oscillograph

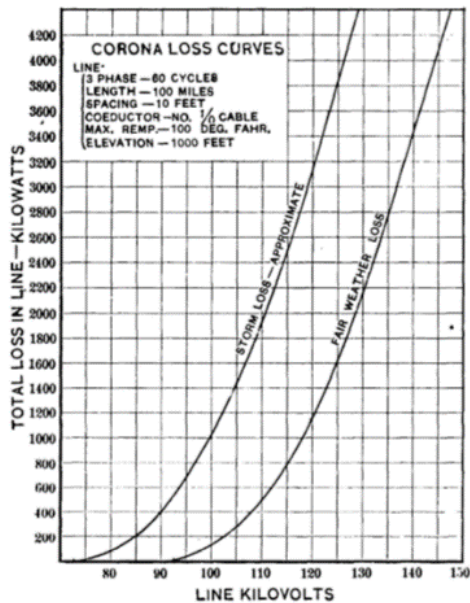
Conductor: 0.0382 cm. diam. smooth

Spacing: 161 cm. to neutral

Length: 305. cm.

Figure 58: Peek's Fig 3A and Fig 3B, Power losses were being plotted and investigated, as shown there was no noticeable disruptive discharge seen below 15kv.

There is a curved linear corona loss to voltage rise. There were no temperature tests on the transmission lines or investigation of power gains around conductors below the critical voltage of power losses. As we know, electricity is related to time (amps per second), there was no experiment made by Peek using time as a parameter for the power losses observed. The system was either on or off and measurements recorded.



Page 1491 - 1495

Figure 59: “Fog lowers the critical voltage and increases the loss. Sleet on the wires, or falling sleet, lowers the critical voltage and increases the loss. High voltages do not entirely eliminate sleet formation. Rainstorms lower the critical voltage and increase the loss. Snowstorms lower the critical voltage and increase the loss. The effect of snow is greater than that of any other weather condition.”

Page 1520 [100]:

“The fact that the curves pass through the zero point does not necessarily mean that there is no loss at zero frequency or continuous impressed voltage.” What takes place is probably this: “When excessive continuous voltages are applied to a conductor, the air is broken down and a transfer of energy which appears as corona takes place. Now if the conditions were constant, such as still air, constant temperature, and no electrostatic repulsion, there would be no further loss than the first energy rush. However, as this over strained air is probably driven away and replaced by fresh air, which is in turn broken down, there is actually a power loss with continuous voltage.”

Conclusions

Peek’s description states there is a breakdown of air that is then replaced by fresh air and this process is repeated and a continuous transfer of energy from the conductor to the air is the reason for increasing power losses with ‘continuous voltages.’ Energy is being transferred from the air due to removal of electrons from air molecules into an expanding electric field in an envelope around the conductor due to an Endothermic Electric effect taking place, an attraction and repulsion reaction. The ionisation of the conductor atoms is the cause of electron attraction from the surrounding air, and this is why the air is broken down into air ions which will be repelled or attracted by the conductors depending on if they are positive or negatively charged.

With continuous voltage there will be a “point in time” during the electric field charge where there will be power loss due to:

- a) Friction on the conductor, this can be observed as black powder oxidation page 1550 of [100]
- b) Plotted measurements with losses shown as corona discharge. (Photographs of luminosity effect, Figure 57 (Peek’s fig 43))

Peek states there is a power loss at the initial rush and energising of the conductor, this is a transfer of energy in the form of electrons to the expanding electric field envelope of the conductor caused by the EMF input and is the result of the Photoelectric Effect taking place on the system.

This study into corona effects shows how ionisation of air occurs around a conductor and how different stages of a reaction are observed, no power losses at first then power losses obeying a quadratic law or linear losses can be plotted with increasing voltages. Kinetic energy is contained within ‘an envelope of corona air’ around the conductor. It is seen that the conductor bundles will repel each other as well as attract a negative charged field surrounding each conductor and hence discharges will take place. The corona between the conductors can be controlled by applying parameters, hence Peek’s equation. The reaction shows how the positive conductor behaves when voltage is placed on it. The conductor grows a surface area of conduction outward due to an increased ionisation of the conductor and this results in available electrons being stripped from the air molecules around it due to the ionisation of the conductor, likes repel and opposites attract. Higher air density in the form of water creates more power losses due to more available electrons from the water as seen in figure 55.

The striking distance deviates from the curve at lower voltages due to a slower or, no discharge of the negative field, a possible reason here is that lower voltage will increase the time parameter before losses. Peek is acknowledging an unknown reason to the theory that he is writing and realises the expanded electric field will hold a finite amount of energy over a finite distance at a finite voltage at a certain conductor size, and voltage raised over these parameters will cause discharge and power loss. All governed by time.

During the endothermic process of an electric field system, there is no resistance or corona losses until certain parameters are met. Firstly, there is an energy gain from the system and the surrounding environment into the expanding electric field. By applying a force to a wire, regarded as applying a voltage, will cause a certain amount of ionisation to the conductor. This is true for AC and DC electricity. Only a certain number of ionised atoms of the conductor are involved in the reaction, not all atoms of the conductor become ionised [103], this is because you have placed a Newton / meter force from the outside of the wire. Due to the applied force, a reaction in the system has been induced, with attraction and repulsion being the reactions seen between positive and negative within the induced envelope of conduction. If the conductor diameter is smaller than another conductor but the same voltage pressure is placed on the two conductors, there is greater corona losses measured on the smaller conductor, as demonstrated by Peek. The reason for this is because there is less surface area available on the conductor, but it has the same attraction force outwards due to the same voltage applied. There is less space

for the attracted electrons to place themselves around the conductor and hence the attraction is more chaotic, and more entropy pursues due to the repulsive forces between the electrons squeezing together in less available area at conductor surface, Peek describes this as: 'flux lines being squeezed closer together'. This causes more losses out of the envelope of conduction or electric field area size, for voltage size, and parameters of system. Electrons cannot move through the conductor; electrons move in the negative part of the electric field. Physicist Bob Eagle [104] expertly explains this in his YouTube video, 'Basic Derivation's of Maxwell's Equations.' Electrons are attracted from the outside to the surface of the positively ionised conductor, and this is where the interaction takes place. The conductor will form a positive repulsive force between its atoms around the conductor surface. Atoms not ionised remaining neutral and hence there is no interaction within the conductor itself between positive ions and neutral atoms. A certain depth of ionisation and number of cations to the surface of the conductor will be achieved depending on force applied. Resistive losses in the form of friction at the conductor surface and corona discharge losses to another conductor's electric field are two separate types of losses in transmission lines.

These studies by Peek and Co, show us how there is not an immediate loss of power in transmission lines, and how parameters can influence the state of the system. Air density can almost double losses and lower the critical voltage power losses. Before observed power loss discharges, Peek suggests there is more energy in the 'envelope of corona' around the conductor than introduced by the voltage supply due to energy gain from the air.

19.2 Self-Charged Graphene Battery Harvests Electricity from Thermal Energy of the Environment

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, and Kin Hung Wong¹

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[105]

Introduction

A study was carried out to see if an energy gain could be utilised in a physical reaction and make a graphene battery with self-charging characteristics. This Graphene Battery experiment by *Zihan Xu et al* is approached with due diligence and with every possible control to substantiate the results obtained, the procedure is robust. Included in my analysis of this experiment is *Zihan Xu* interesting conclusions.

It is made clear from the process of the experiment that the parameters are key to understanding how ion and electron attraction force can influence an element or molecule to be altered from its initial neutral state and be used for useful power. There is a transfer of energy from the environment which is converted to electron volts in the battery system. The vibrational force of the Cu^{2+} action on the graphene lattice will continue the reaction. The conclusion of the experiment claims that the ionic force of the Cu^{2+} would liberate an electron from the graphene structure if the number of layers of the graphene structure is 2 or less layers in thickness. It is also clear in our understanding of graphene that its structure has the greatest number of atoms in the lattices outer edge structure.

Battery Design

Parameters

1. A large surface area of graphene to a volume of electrolyte, the bi-layer graphene is connected in a series connection to optimise low voltage production.
2. The electrolyte used was a solution of CuCl_2 , the properties of this electrolyte showed a positive correlation to thermal voltage charge to room temperature conditions. A selective process was used.
3. The binary layer of graphene was suspended in electrolyte with a large volume solution to area of graphene, this allowed for lots of available ions to be available for interaction in the electrolyte.
4. Asymmetric electrodes configuration. The reason for this design was to allow for an efficient route for electron to load, with no inference due to same polarity characteristics from other electrode.

Formula System Function of Graphene Battery

The first event in the reaction is:

$$h \nu \text{ (electromagnetic wave)} = \phi + K.E. \quad (\text{Equation A, the photoelectric effect})$$



The electrolyte is ionised by the h.v. There is now an electric field surrounding the graphene. Maxwell's electric field equation.

$$E = \frac{Q}{4\pi\epsilon r^2} \quad (\text{Equation B})$$

We can now Substitute Q for

$$E = \frac{\text{Cu}^{2+} + 2\text{Cl}^-}{4\pi\epsilon r^2}$$

The interaction of the Cu^{2+} with the graphene atom lattice due to thermal movement of Cu^{2+} :

$$\text{Force (Cu}^{2+}) + \text{Graphene} = \text{Graphene ion}^+ + e^- \quad (\text{Equation C})$$

$$\text{Then: } Force = \frac{Qq}{4\pi\epsilon r^2} \quad (\text{Equation D})$$

Substituting

$$Electricity = \frac{\text{Load (Electrode +)} (e^-)}{4\pi\epsilon r^2}$$

Explanation of Raman Shift Data

In this section I have gone a step further with Raman shift data analysis. Raman spectroscopy is based on molecular vibrations and is the scattering picture captured of an incident light applied to a vibrational energy of a molecule or sample of some type [106]. As seen in fig a.

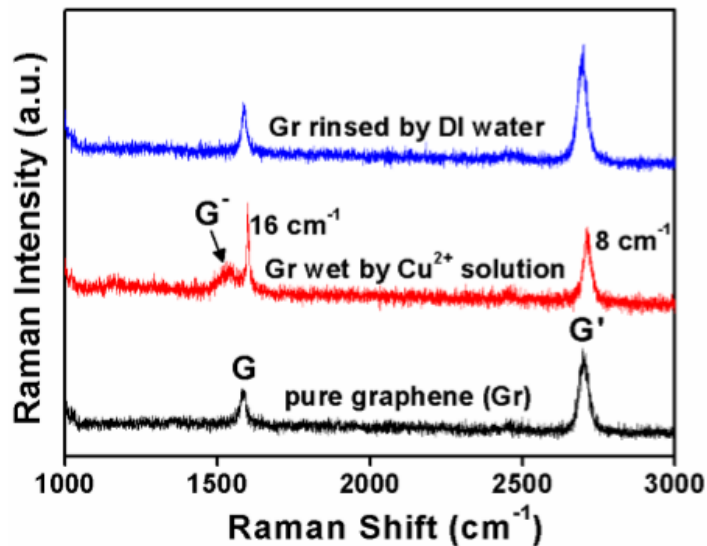


Fig a: The Raman shift light scattering collected between 1500 -1600 for Cu²⁺ solution has comeback as a scattered light in a particular shape that is not symmetrical when the Graphene is wet with Cu²⁺ solution.

The Raman shift fig a shows three variations in the vibrational fingerprint of the graphene.

- I. Graphene rinsed in DI water**
This is an expected fingerprint of graphene in G Band, the wavelength is symmetrical.
- II. Graphene wet with Cu²⁺ solution**
The wavelength has become anti-symmetrical, the vibrational state of the graphene has been altered to what is normally expected in the G Band.
- III. Pure graphene**
This is an expected fingerprint of graphene in G Band, the wavelength is symmetrical.

Maxwell added the displacement current to give symmetry to the mathematics of electromagnetism, this was the marrying of time varying electric fields with Ampere's law of proportionality. The reason for this was to account for all observations and expressed with symmetry through mathematical expressions. In Fig a, we are seeing something that is not thought of as symmetrical in the Graphene wet with Cu²⁺ solution, compared to the Graphene rinsed in DI water, and the Pure graphene. We also know we are looking at a sample that is producing energy and hence there is an electric field associated with the sample fingerprint. To benefit from symmetrical analysis of the sample which is displaying a different molecular

vibration as to what is expected, we can add some symmetry to the light scattering through symmetrical modelling, considering this as an electric field vibration.

Graphene wet with Cu^{2+} solution

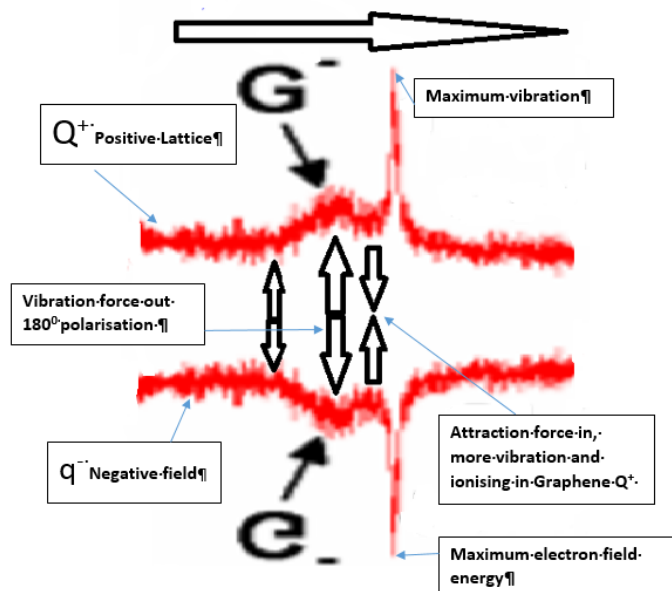


Fig y: *Electric field depiction from Raman Shift Data: We know the sample is in an electric field state due to power to the LED as shown in Fig 4b of [105].*

In fig a, the shape of the wavelength can be considered as the graphene's electric field fingerprint as depicted by the Raman shift spectroscopy. We can manipulate Fig 2b of [105], duplicate and flip 180° to have a positive Q^+ and negative q^- view to represent a Raman shift molecular vibration of the electric field with symmetry applied. We now have a symmetrical view of the vibration throughout the electric field of the graphene. Raman shift and direction of the reaction is from left to right.

This shows the effect of an EMF collision as the physical catalyst to the graphene producing an electric current, a force inward by the Cu^{2+} which induces an electric field as depicted in fig y. This starts a physical reaction in the graphene lattice, a vibrational force outward from the centre of the graphene atom creates a separation of neutral charge to a $Q^+ - q^-$ active electric field of the graphene. Duality is created in the form of negative electrons released from the graphene lattice which leaves the atom in a positive state due to release of electrons. Electrons populate the negative part of the electric field; an endothermic heat gain is initiated.

1. First there is a vibrational *force into* the graphene by Cu^{2+} to start ionisation reaction, the number of graphene ions created depends on the force applied and density of the material.
2. This vibration reaches a peak, 90° from neutral state in both directions, to a charged state of the electric field, the electric field has now been filled with electrons in an endothermic energy gain of attraction to the vibrating lattice.

3. We have attraction *force in*, to the lattice Q^+ by q^- . The field is now being pressurised by positive and negative attraction; this pressure produces more graphene ions.
4. Next there is a 2nd *force out* vibration due to the previous pressurisation of the field, this creates more vibration to the lattice Q^+ which leads to more ionisation of graphene atoms which attracts more electrons to the q^- electric field as the vibration increases in size in Q^+ . A further endothermic reaction happens and allows for further electron attraction to the maximum field size.
5. Expulsion of electrons to a dominating attractive load, the electrode $+$. This process is a continuous reaction fingerprint with respect to time and a continuous EMF to the circuit designed.

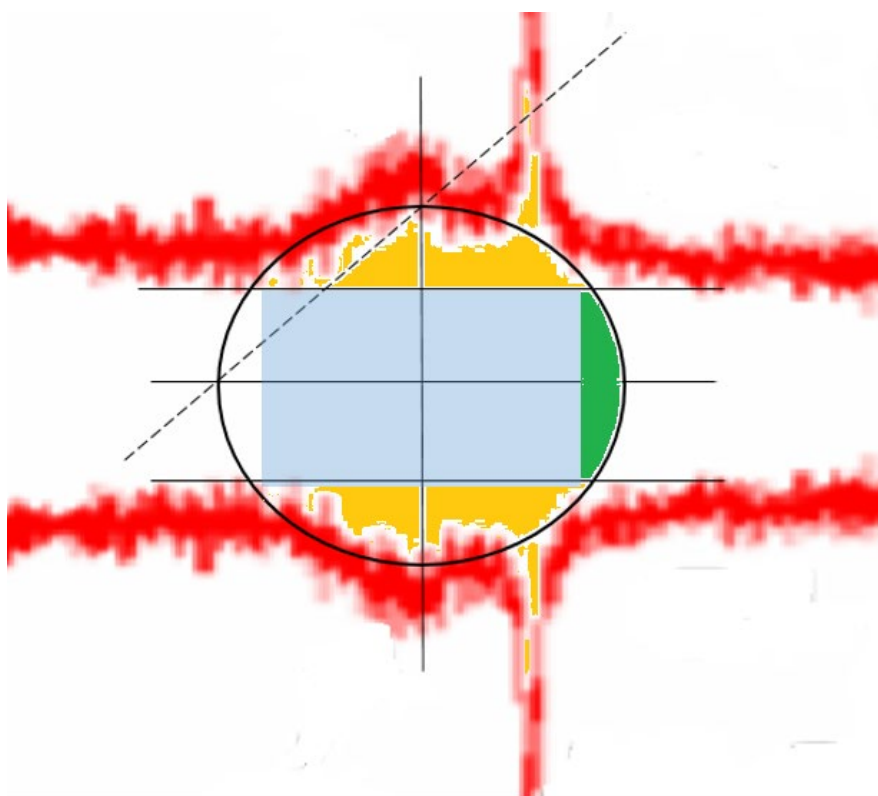


Fig Z: Separation of charge and energy gain depiction.

Circle – square – 2green = Kinetic Energy E field gain (16)

----- = separation of electrons from atoms, producing atom ions.

This anti-symmetrical fingerprint in the G band, I now demonstrate as a symmetrical fingerprint in fig z.

In this case experiment by *Zihan Xu* the graphene is doped with the $\text{Cu}^{2+} \text{Cl}^-$ solution.

The experiment scientists conclude:

1. *Thus, we reasonably predicted that all single-atom-layer materials should have this kind of effect.*
2. *Based on the proposed mechanism, we predicted that any ions or small molecules which have enough energy can excite electrons out of graphene.*
3. *So the atomic-layer nature of graphene is crucial for the electricity generation.*
4. *In conclusion, we could not find any evidence that support the opinion that the induced voltage came from chemical reaction. The mechanism for electricity generation by graphene in solution is a pure physical process, which is discussed in detail in the text.*
5. *We also measured the output power of a typical device whose exposed area was about $10 \text{ mm} \times 5 \text{ mm}$. When a 22 Kohm resistor loaded to it, the output power reached a peak of about $1.38 \mu\text{W}$, which means that the theoretical power density is about 73.3 KW/Kg*

PHEV Prismatic Cell Specification			
PHEV PRISMATIC CELL DATA SHEET**			
CHEMISTRY	Cathode	Monophosphate	
	Anode	Graphite	
	Electrolyte	1.2 M LiPF ₆ in EC/DMC 4:6	
	Separator	Celstar	
DESIGN	Packaging	Laminated Aluminum Pouch	
	Structure	Formed Laminated Aluminum Pouch	
	Shape	Prismatic	
FEATURES	Size (mm)	7.2 x 151.5 x 217	
	Weight (kg)	6.495	
	Volume without tabs (L)	0.261	
	Volume with tabs (L)	0.2815	
ELECTRICAL SPECIFICATIONS	Cell Level	Min Capacity/Energy (C3 to Vmin=2.0V, RT) (Ah/Wh)	19.5/63.0
		Min Capacity/Energy (1C to Vmin=2.0V, RT) (Ah/Wh)	19.3/62.4
		Max discharge (A)	300
		155C and Temp. Dependent	
		Max charge (A)	300
		155C and Temp. Dependent	
		Max constant current/10s pulse voltage (V)	3.6/3.8
		Min constant current/10s pulse voltage (V)	2.0/1.6
		Specific energy (Wh/kg)	127
		Energy density (Wh/L)	240
		Power density (W/kg @ 55°C, RT)	3,000 W/kg
		Self discharge (@ 25 °C)	<7%/month
THERMAL		Operating temperature	-30°C to 55°C
		Storage temperature	-40°C to 60°C

This data sheet of a lithium battery shows a power density of 3 KW / KG @ 50%soc. This is a significant difference to graphene data 73.3 KW/Kg.

Conclusions

Quote by Issac Newton

"Any description of curves by instruments, even that of the circle itself by compasses and of the straight line by a ruler, is mechanical, and [the ancients] consequently postulated the descriptions of those they received into geometry – not that these might, insofar as they are geometrical, be described by men (for who has seen a line without breadth?) but that, once their description is granted, all the rest of what geometers derive therefrom shall accurately follow from it".

(NMPVII,p.383)

Interpreting Newton : Critical Essays, edited by Andrew Janiak, and Eric Schliesser, Cambridge University Press, 2012. ProQuest Ebook Central, <http://ebookcentral.proquest.com/lib/swansea-ebooks/detail.action?docID=807158>.

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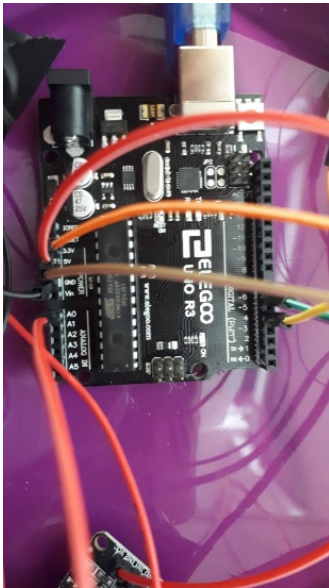
This graphene battery design is an example of critical parameters in a system designed to benefit from an unobvious gain in electricity. It is the action of wavelengths of light, the Photoelectric Effect, and thermal temperature that start a chain reaction in the system. The electrolyte is carefully selected from test results to interact with the graphene. The thin binary layer of graphene allows the transfer of kinetic energy to a separation of charge within the graphene lattice. The graphene of ‘no more than 2 layers’ allows the Cu^{2+} to induce a frequency vibration or EMF, which has an effect that will not just dissipate in the graphene lattice with no ionisation effect but cause a catalyst reaction. The graphene is induced with an eV energy level that allows the electrons of the graphene atoms to separate from the atom lattice and produce the negative field around the energised ion lattice. With continuous force available from the Cu^{2+} and thermal environment and heat continually replenishing eV energy level in electrolyte (the photoelectric effect taking place), the graphene electrons will continually migrate to the attractive positive electrode load from the graphene’s electric field due to a path of least resistance and attraction force to load. One might expect the electrons to be attracted into the Cu^{2+} solution, but this is not the case as this is a physical reaction, bonding to another element in a chemical reaction would not be the path of least resistance as this would require the energy of the electron to be absorbed in a chemical reaction with the Cu^{2+} , this is obviously not the case.

Dense stacking of layers of graphene would reduce the electric field effect response to joules charge, as the dissipation of Cu^{2+} vibration would affect a larger surface area of the graphene atoms. Graphene has a well-defined band network in its structure, and therefore has a high tensile strength. Other materials as commented by the scientists, would need a higher temperature to create useable energy in a single layer structure, and this suggests a larger voltage would be required to ionise denser materials that in turn would enable the release of electrons in an increasingly denser structure. A larger surface area with more graphene layers and hence a denser graphene would have a less responsive effect at this low voltage in terms of energy production. Therefore, using single or bi-layer graphene is a suitable approach for electricity production using low atmospheric thermal voltage ionisation. This graphene battery design experiment confirms that energy is extracted from the material of the system in the form of electrons, a physical reaction. This now points to how you can benefit from not only thermal harvesting of energy but also energy harvesting from the system itself. As we know, systems made with certain parameters engaged can harvest an endothermic energy gain from the surrounding gases. This also suggests an increasing amount of Q^+ is required to influence q^- over an increasing dense surface area of any system design. Just as the quote from Newton says, “*but that, once their description is granted, all the rest of what geometers derive there from shall accurately follow from it*”.

20 Glossary

Swansea and Home Experimental set up.

Ports on microcontroller and operation



The Elegoo Uno R3 Microcontroller (M.C) is suitable with Arduino software and is used to control the circuit.

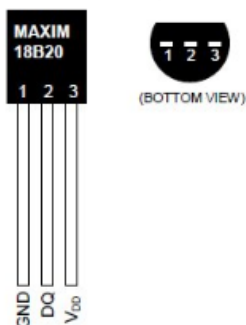
Dallas temperature sensors 3 of, are used. A 4K7 ohm pull up resistor is required on the Data acquisition pin to pull it up to 5V to ensure operating through the one wire data acquisition.

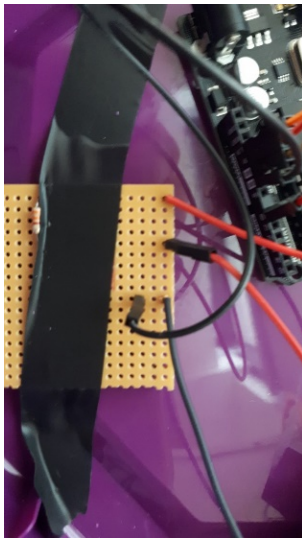
Drag and drop the DallasTemperature folder into your arduino/libraries folder

If you dont already have the OneWire library then you will need to copy that folder into the libraries folder also.

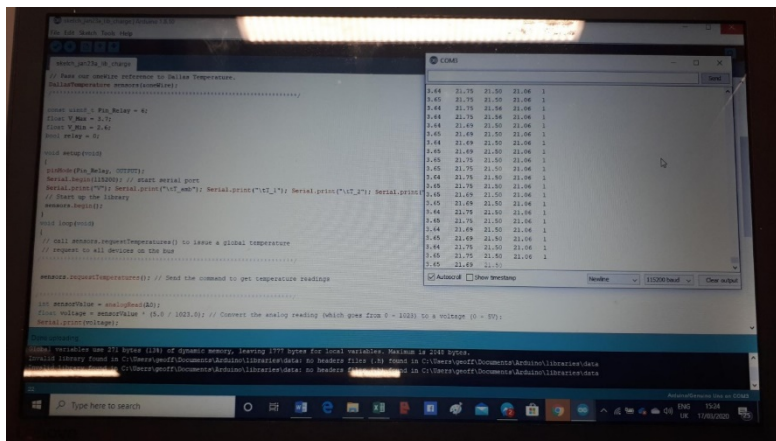
Now, before we get to the programming part, lets wire up our temperature sensor. The DS18B20 can be powered by between 3.0V and 5.5V so you can simply connect its GND pin to 0V and the VDD pin to +5V from the Arduino. However, the DS18B20 can also extract its power from the data line which means we only effectively need two wires to connect it up. This makes it great for use as an external sensor.

A4 = Digital input for the temp sensors and outputted data through serial monitor.





A0 = This is an analogue to digital converter input on the M.C. The rising voltage in the battery is recorded through the 3.25K Ω resistor as seen in the circuit diagram Fig 32



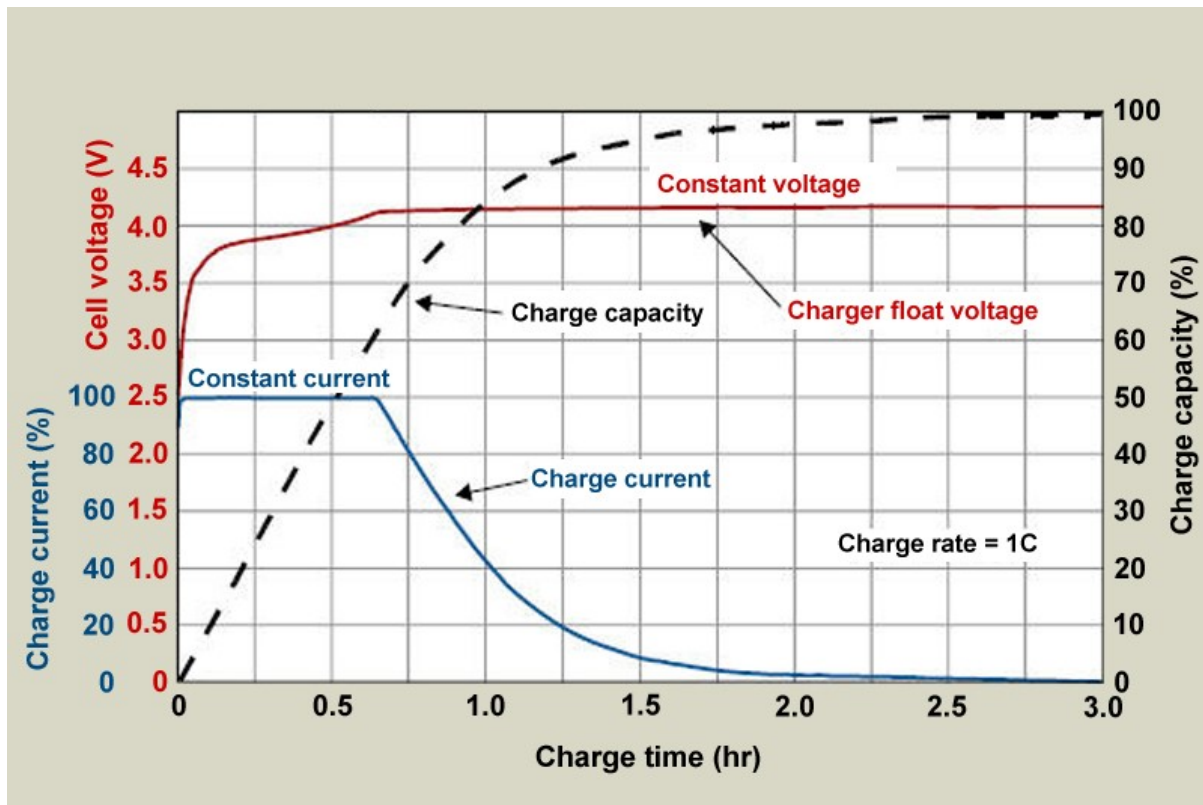
The data is collected and read in the serial monitor of the Arduino software during the charge cycle.

Graphs were generated using excel.

A6 = Digital output control to Relay for high or low operation of charge circuit on M.C.



The power supply on/off is controlled through this high-current relay; DC30V 10A. Equipped with indication LED's for Relay output status. With software code seen through digital pin13. The relay is driven with a separate 5V power supply.



Charge characteristics of a lithium battery by battery university. As can be seen, temperature is not a consideration of the charge.

Constant current for charging

C1 = manufacturers amp hour specification.

Panasonic NCR18650B – 18650 Battery

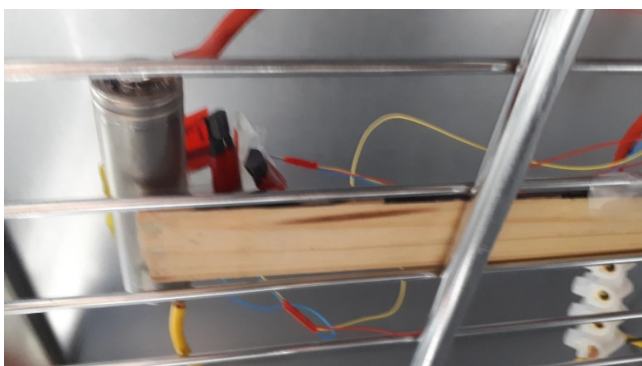
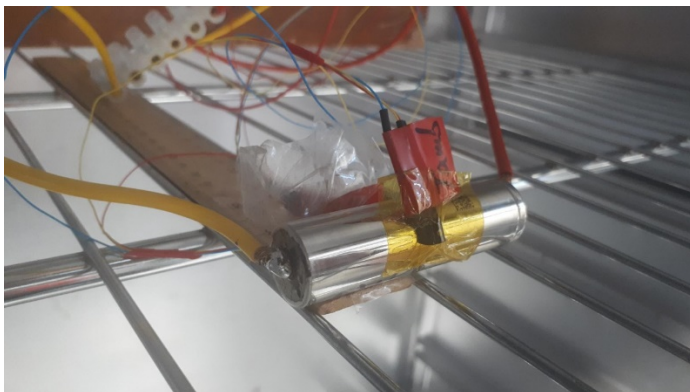


Brand: Panasonic
 Size: NCR18650B
 Chemistry: NCR (Hybrid)
 Nominal Capacity: 3350mAh
 Nominal Voltage: 3.7V
 Discharge: 5A Max Continuous
 Positive: Flat Top
 Protected: NO.
 Rechargeable: Yes
 Dimensions: Height: 65mm, Width 18mm
 Weight: 47.5g

Samsung 30Q – 18650 Battery



Brand: Samsung SDI
Model: 30Q, INR18650-30Q (30Q M)
Size: 18650
Chemistry: INR
Nominal Capacity: 3000mAh
Nominal Voltage: 3.6V
Discharge: 15A Max Continuous
Positive: Flat
Protected: No
Rechargeable: Yes
Dimensions: 18.23mm x 64.78mm
Weight: 46.1g



Sony VTC6 – 18650 Battery



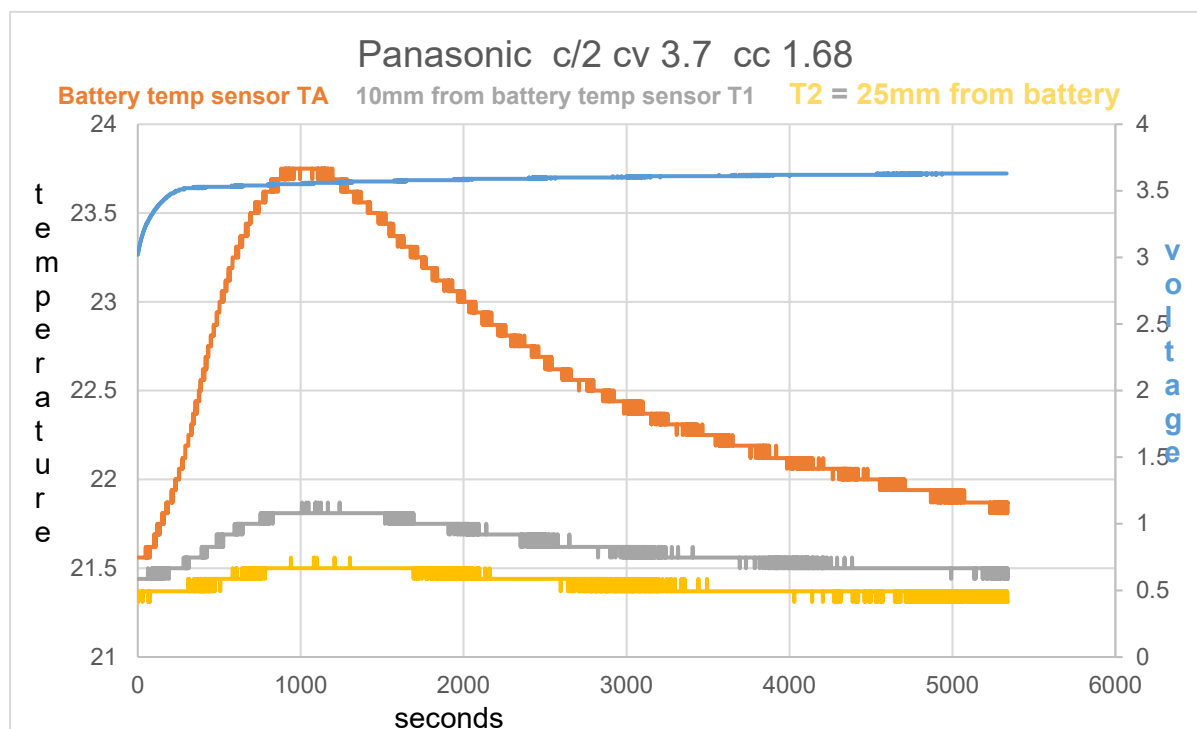
Brand: Sony Energy
 Model: VTC6 (US18650VTC6)
 Size: 18650
 Chemistry: NMC
 Nominal Capacity: 3000mAh
 Nominal Voltage: 3.6V
 Discharge: 15A Max Continuous or 30A Max Continuous with 80C temperature cutoff
 Positive: Flat
 Protected: NO, UNPROTECTED
 Rechargeable: Yes
 Dimensions: 18.2mm x 64.9mm
 Weight: 46.8g

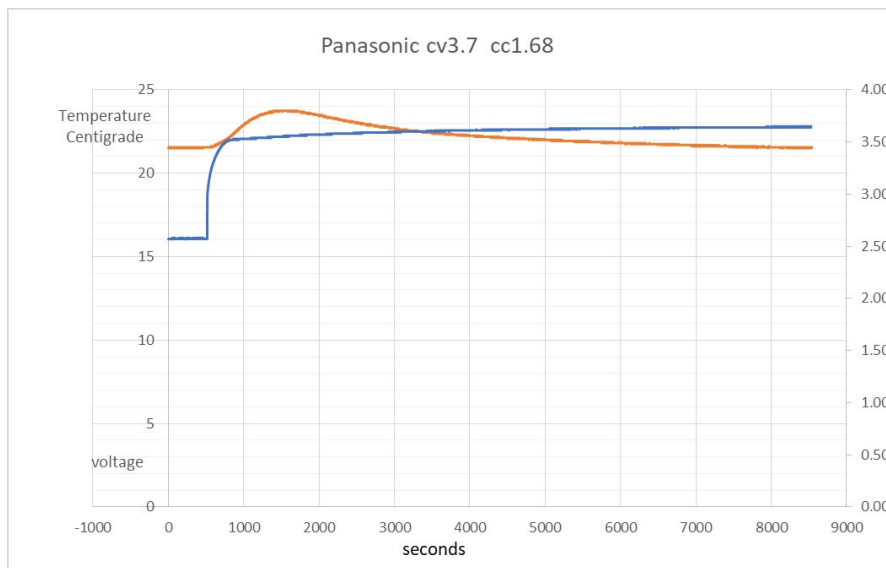


Genysis DC 750W power supply reading rising voltage and constant current.

Tests

Test 10





Constant voltage = 3.7v constant current = $c/2 = 1.68$ amps

Starting voltage = 2.57 finish voltage 3.64

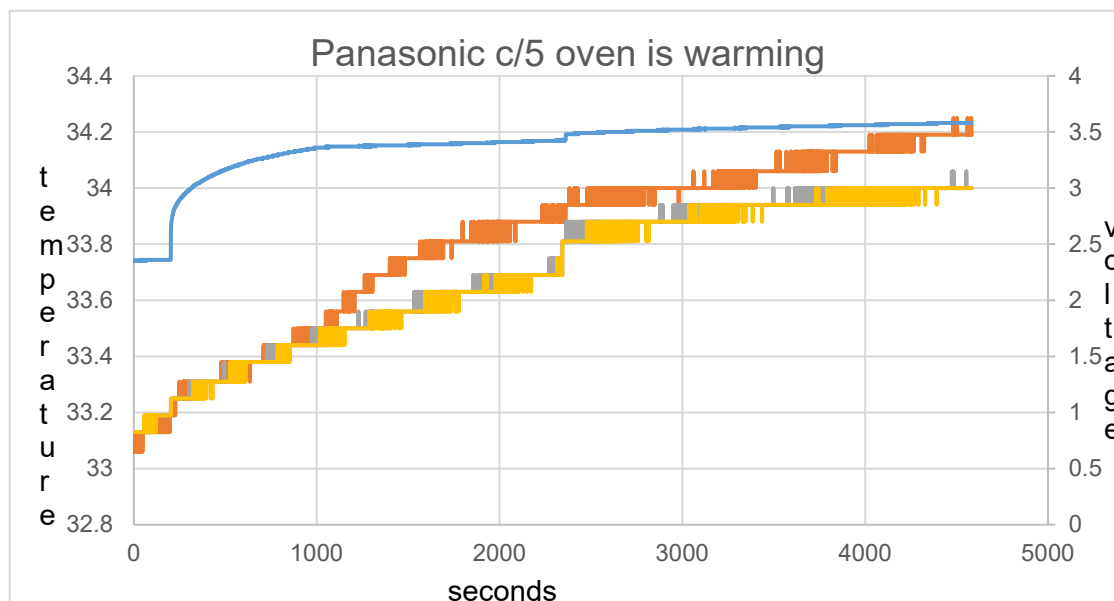
The experiment was conducted at room temperature.

The battery showed an exothermic reaction at first. then endothermic.

The temperature sensors showed their sensitivity to the reaction.

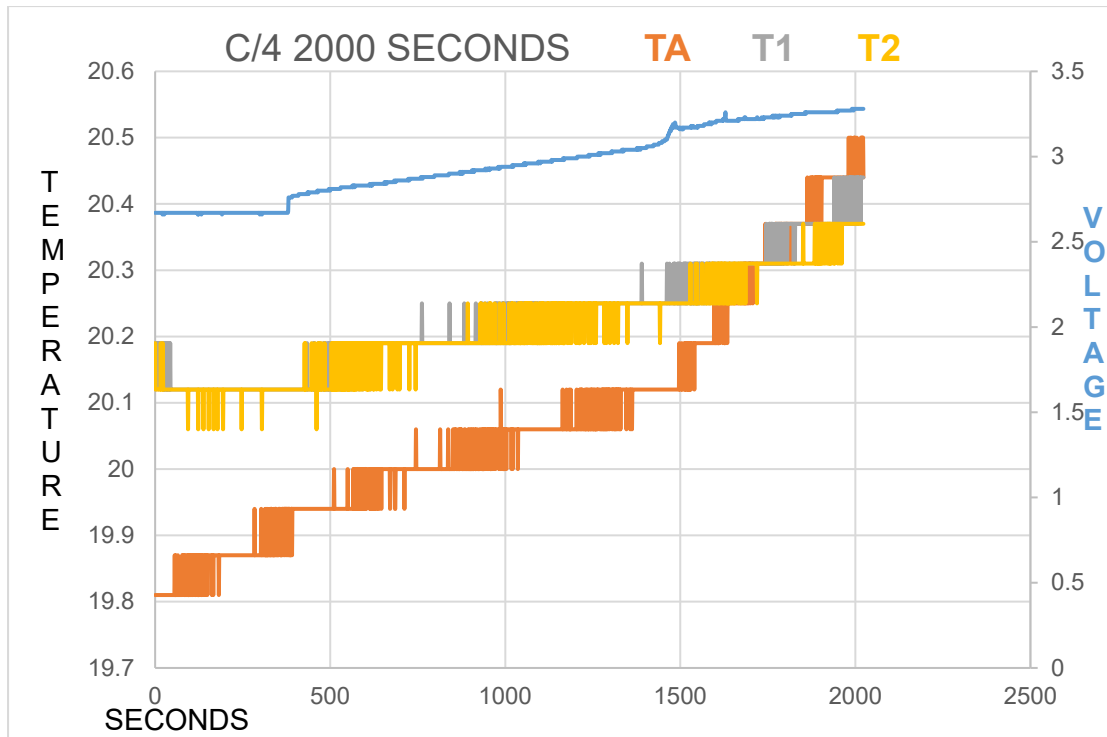
The exothermic reaction peaked at 1230 seconds and then the battery cooled for the rest of the charge.

Test 11

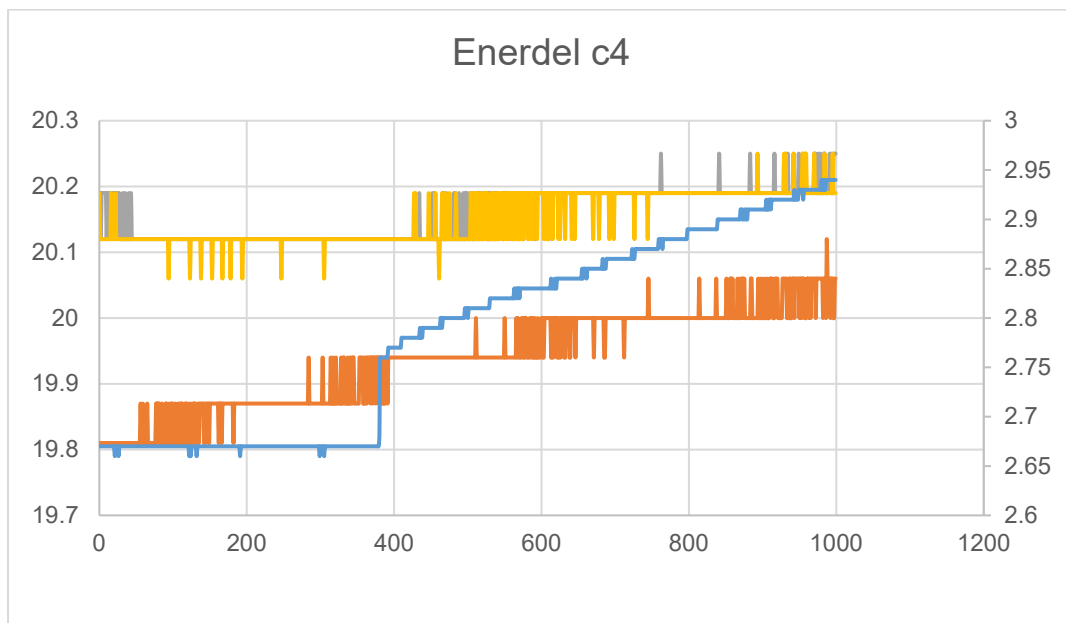


Test 12

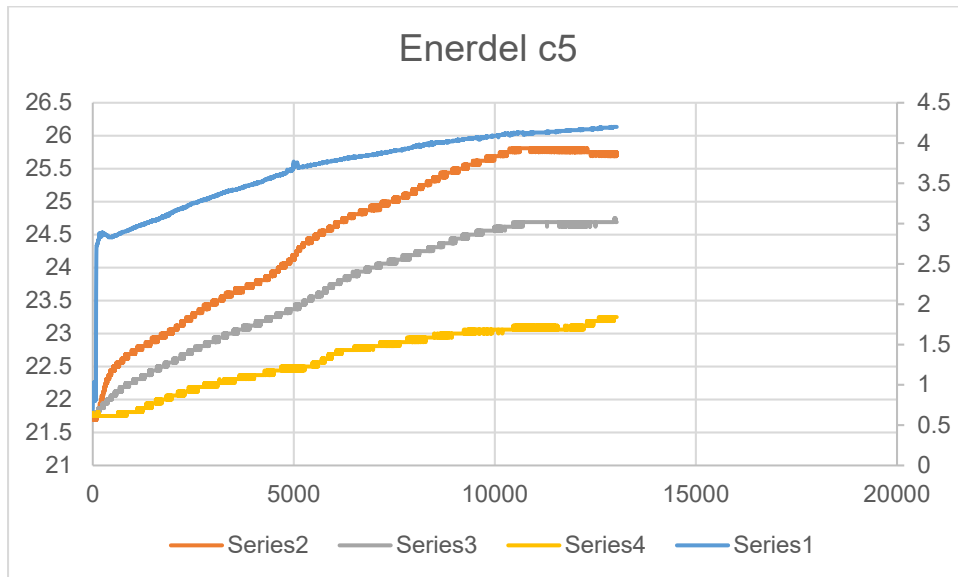
Samsung C/4



Test 13

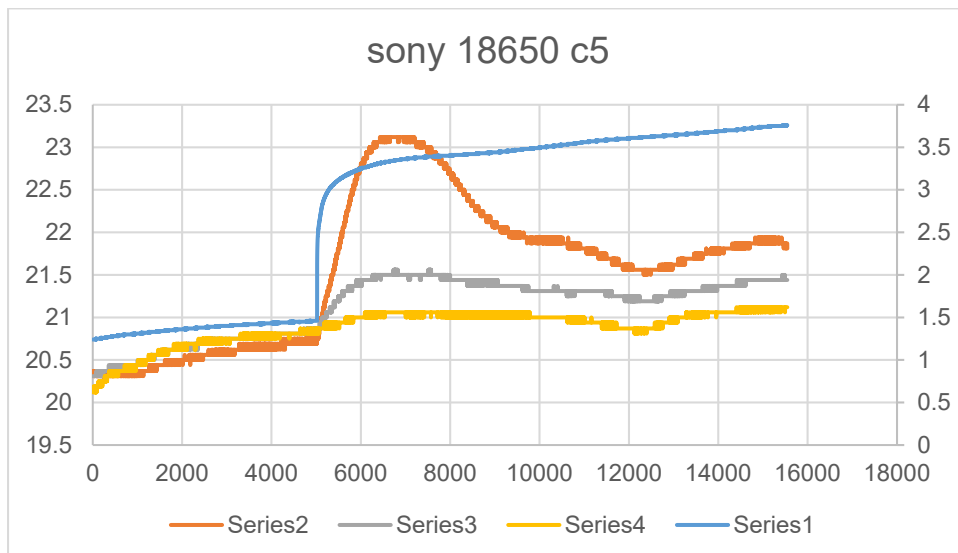


Test 14

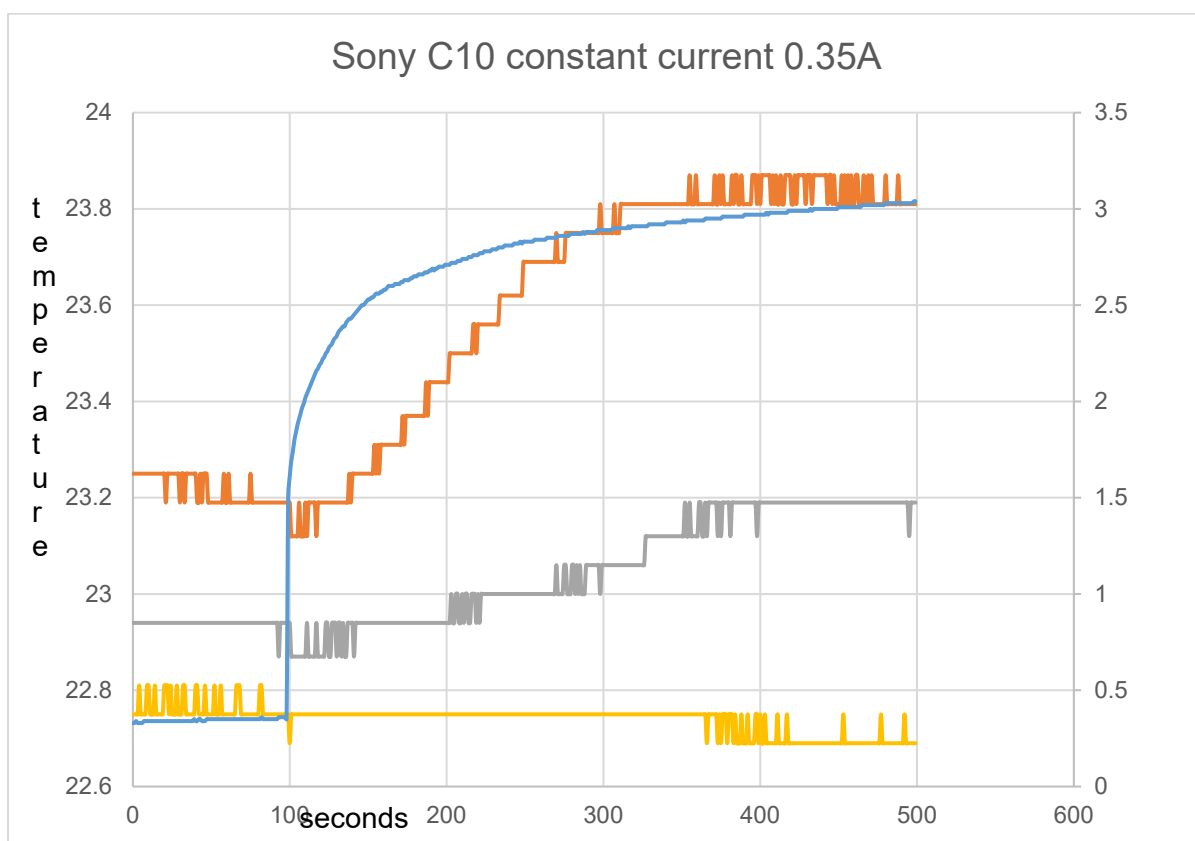
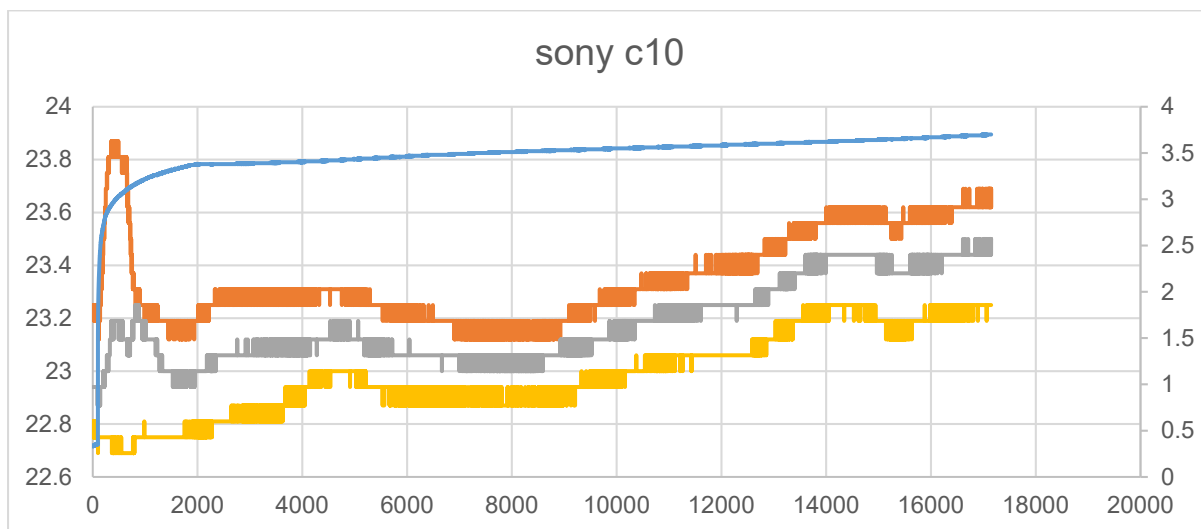


The battery was showing unusual effects due to degeneration of the battery.

Test 15



Test 16



Endothermic reaction seen briefly with voltage engagement.

21 On Reflection

This Master of Philosophy identifies three of the biggest crimes against humanity, all perpetrated in the last 40 years.

1. The fraud to stop Newman's generator and discredit Newman. This has been achieved through academia and mainstream media, perpetrated by the people who control the US Government using NBS and the judicial court system.
2. The crime of 9/11, as revealed by Richard Gage and the 9/11 truth movement.
3. The covid con as being revealed by thousands of scientists and medical doctors.

When I had the first inclination to try and solve the problem of Newman's generator, little did I know where this journey would end and what I might find. This research has surprised me in the sense that all the answers to the problem were there in plain sight and just by using physics we already know, I was able to come up with a scientific backed answer through experiments, to how the Newman machine actually did work and how Newman's claims were not impossible but actually scientifically correct. He captured and demonstrated the displacement current Maxwell allowed for in the mathematics of electromagnetism.

Not all eventualities can be seen whilst you are traveling the road to the destination, so no matter where you are with your journey, the answer will present itself. It is up to the researcher to see what is in front of his nose and senses. I sincerely hope this work I present in front of you can give you a deeper understanding of electricity and what is possible for the future.

This work can be viewed at: www.endothermic-electricity.com

22 Recommendations

1. Teach Electricity as an endothermic reaction as well as an exothermic reaction. This is a part of electricity physics that has been unknown or not reported before and will broaden our technology in future. This should include Newman's work- The Energy Machine- this is a great example of how to obtain Maxwell's displacement current and benefit from over unity energy production.
2. The diagrams, figures, equations, and formulas within this work teach a further and deeper understanding of electricity as we know it. This work should be included in the curriculum education for future generations of students, one will be denying them of a full knowledge of electricity if it is not taught.
3. Build Endothermic energy systems for teaching and energy generation purposes.
4. Update electricity physics to show how the electric field charge is different to how it has been considered since Townsend's work. How this changes the theory to first there is 'order' then 'disorder' in the electric field charge.
5. A correction in science history on the Newman machine in the pursuit of scientific truth. An example of Maxwell's displacement current.
6. A retraction of the NBS test as credible science due to fraud by the government and court of the time, and this has been misleading academic science since 1989.

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24 Index

A123 Battery Test

Laboratory procedures

NB The battery graph (fig 27) data was taken from the top charge, the starting temperature of the batteries for recharge was achieved after discharge from 0, 20 and 40 degrees centigrade respectively, and a 30-minute rest before recharge.

Ic is the manufactures term for the discharge output time to the rated power of the battery in respect of time, eg, 100mAH battery should discharge for one hour at a rate of 100mA.

A123 systems GTV – 19.3Ah Prismatic Pouch Cell.

The battery simulated is the A123 systems

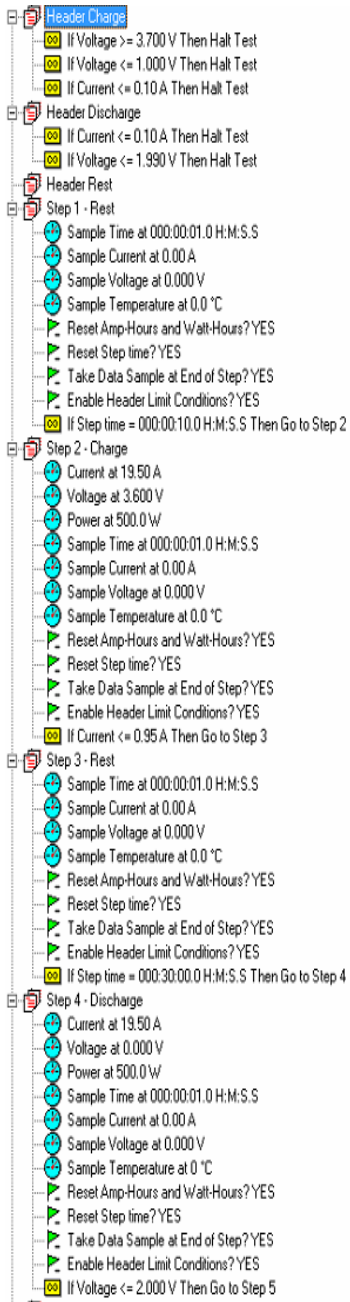
GTV – 19.3Ah Prismatic Pouch Cell.

The data sheet provides specifications for battery:

Capacity 19.3Ah,

Upper voltage limit 3.6V, Lower voltage limit 2V.

The simulation model program is populated with battery specifications,

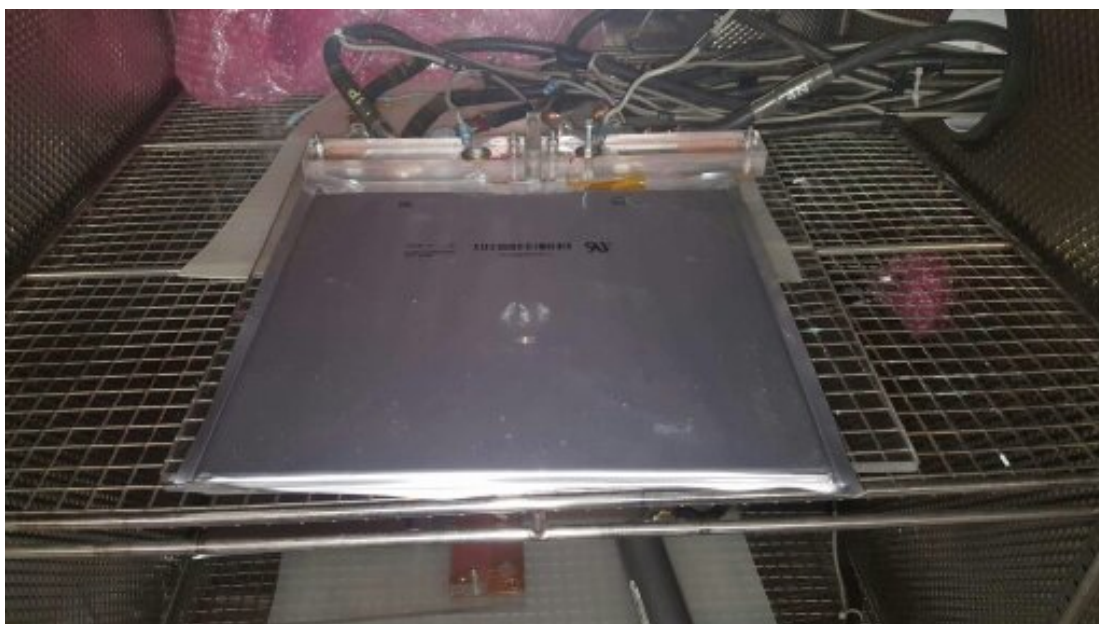




PHEV Prismatic Cell Specification

PHEV PRISMATIC CELL DATA SHEET**		
CHEMISTRY	Cathode	Nanophosphate
	Anode	Graphite
	Electrolyte	1.2 M LiPF ₆ in EC/EMC 4:6
	Separator	Olefin
DESIGN	Packaging	Laminated Aluminum Pouch
	Structure	Formed Laminated Aluminum Pouch
	Shape	Prismatic
FEATURES	Size (mm)	GEN1.5 7.2 x 161 x 227
	Weight (kg)	0.495
	Volume without tabs (L)	0.263
ELECTRICAL SPECIFICATIONS	Cell Level	GEN1.5 Min Capacity/Energy (C/3 to Vmin=2.0V, RT) (Ah/Wh)
		19.5/ 63.0
		Min Capacity/Energy (1C to Vmin=2.0V, RT) (Ah/Wh)
		19.3/62.4
		I _{max} discharge (A) (SOC and Temp. Dependant)
		300
		I _{max} charge (A) (SOC and Temp. Dependant)
		300
		Nominal Voltage (V)
		3.23
		Max constant current/10s pulse voltage (V)
		3.6/3.8
THERMAL	Operating temperature	GEN1.5 -30°C to 55°C
		Storage temperature
		-40°C to 60°C

*Current Data based on Engineering Analysis/Verification **Cell Performance will vary with temperature
 ©2010 A123 Systems, Inc. All rights reserved. Proprietary and confidential.



A program was made using LCN software,

The program is designed to perform the same constant current discharge with all the 3 batteries being tested. Another program is designed to perform pulse charge/discharge tests on the batteries with discharges of: 1C, 2C and 5C and a charging rating of 0.5C each time: LCN software readout.

Capacity Test Steps

1. Identify the batteries specification
2. Charge and discharge the cells through the program.
3. Set header conditions: Voltage and temperature Parameters are set for the program steps of the header charge, header discharge and header rest cycle. This is for safety reasons and accuracy of voltage measurements, for example here are parameters met for A123 battery.
4. Header Charge
5. If Voltage ≥ 3.610 V Then Halt Test
6. If Voltage ≤ 1.900 V Then Halt Test
7. If Temperature ≥ 50.0 °C Then Halt Test
8. Header Discharge
9. If Voltage ≥ 3.610 V Then Halt Test
10. If Temperature ≥ 50.0 °C Then Halt Test
11. If Voltage ≤ 1.900 V Then Halt Test
12. Header Rest
 - If Voltage ≤ 1.900 V Then Halt Test
 - If Temperature ≥ 50.0 °C Then Halt Test
 - If Voltage ≥ 3.610 V Then Halt Test

Once the header parameter limits are installed, the program can be written using different stages (steps) for the experiment. The sample time for all steps is set to 1 second.

Step 1 –

- I. Rest
- II. Select a new step
- III. Allow the battery to rest for 10 seconds in open voltage state as to obtain reliable voltage readings during test
- IV. Sample time set to 1 second and then a new limit set
- V. Step time to 10 seconds and the outcome to be the next step.

Step 2 – Header Charge

- I. This step is to charge the battery to make sure it is completely charged before any tests are carried out. For this step, set the current to 50% of the Amp/hour capacity (0.5C).
- II. The voltage should be set to the charging voltage of the cell
- III. Temperature set to 25°C.
- IV. The sample time set to 1 second
- V. The current value is C rating x 0.5,
- VI. The sample time should be set to 1 second.

Step 3 – Rest

- I. Rest the battery after full charge
- II. Sample time set to 1 second
- III. New limit set at 30 minute sampling time continue to the next step.

Step – 4 Discharge

This is the first discharge step to get the needed results, the first discharge test is at a 1C. The current needs to be set to the capacity rating of the battery, the sample time needs to be 1 second and the power set to a limit above the maximum power being discharged from the battery. The discharge limit is the voltage set to the minimum battery voltage. Once it reaches this minimum voltage it should be set to move onto the next step.

Step – 5 Rest

This step is to let the battery rest after it has been discharged, the sample time needs to be set to 1 second and a new limit placed for 30 minutes. This is the final step for the first discharge test at 1C, we now need to copy from steps from 2 (Charge) until 5 (Rest) but with the new values for the new discharge rate. You will need to change the current drawn and the next step number of the copied steps and when the last test is finished you will need to do a **top up charge** to make sure it is stored correctly. This is the same as the charge step but when it is fully charged the next step needs to be set to end test and the total number of steps for each battery should be 14.



24.1 Academic Integrity

Definition of Academic Integrity and Academic misconduct by Swansea University

Academic integrity is important as it enables all students to be judged fairly and on the merits of their own work and research. This in turn allows you to have pride and confidence in your achievements, and to prosper beyond university without resorting to unethical practices.

Academic integrity reflects a shared set of principles which include honesty, trust, diligence, fairness and respect and is about maintaining the integrity of a student's work and their award. Academic integrity is based on the ethos that how you learn is as important as what you learn. Academic integrity is based upon a number of core principles. For students, this means:

- Taking responsibility for their own work and studies;
- Respecting the opinions of others, even if they do not agree with them;
- Respecting the rights of others to work and study within the 'learning community';
- Acknowledging the work of others, where it has contributed to their own studies, research or publications;
- Ensuring that the individual's contribution to group work is represented honestly;
- Supporting others to behave with academic integrity;
- Following the ethical requirements and where appropriate professional standards appropriate to the discipline;
- Avoiding actions which would give an unfair advantage over others;
- Ensuring that the results of research or experimental data are represented honestly;
- Complying with the assessment requirements.

Academic integrity is the guiding principle for all student assessment; from taking exams, making oral presentations, or writing assignments; dissertations or theses for assessment.

Academic misconduct includes: plagiarism; **collusion**; breach of examination regulations; fabrication of data; impersonation of others or the commissioning of work for assessment (this list is not exhaustive).

Author Note:

I have colour marked these statements and words to highlight the importance of the standards expected. This type of conduct is how science should behave and this conduct should be inclusive to students, universities, supervisors, judges, and government agencies. (This list is not exhaustive)

24.2 All in it Together



