

SWANSEA UNIVERSITY

EXAMINATION OF MA/MSC/LLM By Research

EXAMINERS' REPORT AND RESULT FORMS

PLEASE TYPE - HANDWRITTEN FORMS WILL NOT BE ACCEPTED

Surname of Candidate Blanche

Forenames of Candidate
(in full) Geoffrey

Student number of
Candidate 946484

The following sections of this document require completion:

1. The **External Examiner's Report** (three sub-sections);
2. The **Internal Examiner's Report** on the thesis;
3. The **Joint Report by the External and Internal Examiners** (to be completed after the oral examination);
4. The **Report by the Chair of Examining Board** on the conduct of the examination;
5. The **Confirmation of Address** form;
6. The **Result Form** making a formal recommendation.

Also in addition the Swansea University **Guide to the Examination of Research Students** and **Guide to the Submission and Presentation of a Thesis for Research Students** should be appended to the above forms, and examiners are asked to read them before proceeding.

A deadline to consider minor corrections/major amendments/resubmitted theses will be set by the College/School. If for any reason you are unable to meet this deadline, please contact the College/School Administrator.

Examiners should be aware that, under the General Data Protection Regulation (GDPR) 2016, candidates have the right to request access to any comments made about them in these reports.

1. EXTERNAL EXAMINER'S REPORT

1.1 External Examiner's Report on Thesis

(Additional sheets may be appended, if necessary.)

The primary study of the thesis is on the "Endothermic Electric Effect". The candidate uses Li-ion batteries as an example to demonstrate that the battery temperature, during a charge, first experiences and endothermic effect causing the cell temperature to decrease before increasing (from a subsequent exothermic effect). This observation is then however used as an explanation to the Newman machine (an energy generator machine).

Here the student gives several explanations to the observed temperature and voltage behaviour and provides the photo-electric effect, and Maxwell's equations as a way of explanation (however the equations are not applied to predict or verify any of the observations).

There are several concerns to the work and quality of the work presented:

- The endothermic effect in a lithium-ion battery is well understood and reported in existing literature. It is related to the lattice structure of the electrodes and is characterised by a coefficient known as the "entropy-coefficient", which relates the open circuit voltage to temperature. However, the candidate does not follow this route in explaining the endothermic effect observed in his battery experimental data (there are no citations to the entropy coefficient, how heat is generated in a battery or to the basic workings of a lithium-ion battery), but attempts to make a connection to the photo electric effect in attempt to justify the Newman machine. This is where the connections and equations provided were incoherent.

- The experiments conducted, and subsequent conclusions drawn are not conclusive. A battery has two heat source terms, reversible (exothermic) and irreversible (endothermic). Depending on the magnitude of the applied current one dominates over the other.

- In the USW data (Chapter 9, figure 27) why are the three starting cell temperatures different and what is the ambient temperature? If the ambient temperature is lower than the initial cell temperature, the cell can cool down to ambient despite the battery being charged. The temperature gradient, between ambient and cell temperature, can outweigh the heat generated (by both irreversible and reversible heat) in the cell. To determine if the cell cooling is truly the endothermic heat generation of the cell (rather than cooling to ambient), the cell temperature must be at equilibrium with the ambient before charging commences.

- In the home experiments (Chapter 11) the cell voltage should at equilibrium before the experiments are conducted. If not, the measured voltage is the relaxation voltage (OCV + over potentials) which appears as "air charge". The cell could be still relaxing since the over potentials in the cell have not vanished to zero from the discharge step it has undergone. No details of how long the cell was kept in the oven or how long the cell was allowed to relax (after fully discharging the cell is given). The results are therefore inconclusive, and the voltage could simply be the relaxation voltage.

- How many batteries were used in the investigation (seems to be one battery)? Observations should ideally have error bars. What is the accuracy of the thermocouple and voltage sensors? Are the observations systematic or random? These were not discussed in the results.

- Can the T2 temperature on pg 62 really be considered as a drop and not a fluctuation due to measurement errors?

- On Pg 72 "you state that some of the electric field charge is coming from the surrounding air electrons", this is not true. There are no electron exchange from the external air, it's the change in the electrode entropy that is causing the voltage to increase (in Figure 41)

- On Pg 75, what the cell temperature below ambient for Test 3?

- On Pg 76 TA increases because the cell is placed in warmer environment and not because of an exothermic reaction.

- On Pg 77 you state "hence discharge of the ions..." there is no discharge reactions taking place in these results (the

Name (block capitals) DHAMMIKA WIDANALAGE (External Examiner)

Signature  Date 20/04/2022

1.2 External Examiner's Report on the Oral Examination

During the examination, the student explained that the motivation for his work is the Newman energy machine. and that lithium-ion batteries are meant to be an example of a electrochemical device displaying endothermic thermal effects as a way of verifying the Newman machine phenomena.

The student was not aware of the work that has been done in the scientific literature that explains the observed endothermic (and exothermic effects) in batteries (which does not rely on nor need photo-electric effects or ideal gas equations). He was not aware of the entropy coefficient of lithium-ion batteries, which is key characteristic of the electrodes and can be used to predict the cell temperature (endo and exothermic) to a given applied current and ambient temperature.)

During his explanations, the student came across as defensive, aggravated and at times condescending. Agreement on many discussion points were difficult to achieve.

Name (block capitals) DHAMMIKA WIDANALAGE (External Examiner)

Signature W.D. Widanage Date 30/05/2022

1.3 External Examiner's Report on matters of general concern or interest, including issues relating to quality and standards, which should be drawn to the attention of the College, or to the University:

The thesis was far from a conventional high-quality report, expected of a MSc by Research. The key motivation of the work by the student was to verify the Newman energy machine, a machine claimed to be capable of generating more power at the output than at its input (efficiency >100%). The lithium-ion battery experiments presented in the thesis do not provide proof of the Newman machine and such claims cannot be supported by the data presented. There is already an existing body of scientific work capable of explaining (and predicting) the temperature dynamics of lithium-ion batteries.

Some experiments were conducted at the student's home. This should not have been the case or allowed, primarily as a safety concern for the student and secondly the data is not reliable for any scientific investigation. Any tests involving li-ion batteries should be done in an appropriate lab setting with necessary safety precautions in place.

The student also dedicated several chapters (Prologue, Declaration of Investigation) to his views on the scientific funding landscape and Covid pandemic theories. These served no purpose in supporting his work.

Many equations were written however their use and purpose were not clear neither applied to make any predictions of the experimental observations.

The thesis was difficult to follow and very poorly structured. Some chapters were only one or two pages long (Chapter 13, 14 and 15).

The quality of the report is well below standard and the student needs more experience in writing a coherent technical report for an MSc by Research qualification. I am not sure how much supervision the student may have received or if his work was read before submission.

Name (block capitals) DHAMMIKA WIDANALAGE (External Examiner)

Signature WD Widanage Date 20/04/2022

2. INTERNAL EXAMINER'S REPORT

(Additional sheets may be appended, if necessary.)

The below technical recommendations must be addressed before re-submission of thesis.

1. Equation (1) needs to be corrected.
2. Equation (2) cannot be used for explaining the special case presented in the experiment, i.e. the endothermic effect at the start of charging process.
3. All equations must be used quantitatively and correctly referenced, i.e. calculated results must be presented with the equation.
4. Photoelectric effect is not applicable to this experiment.
5. The image quality of all experimental figures needs to be improved. All experimental figures need to be added error bars.
6. Figures 52 and 53 are not correct, electrons don't flow in air circling a conductor.
7. Basic operation principle of the battery under investigation must be presented.
8. Part or full of reference papers cannot be directly copied and pasted into thesis, for example on page 114, section 19.2
9. References should be correctly formatted, for example using standard IEEE conference or journal format. More literature study needs to be conducted in relation to batteries, battery charging, temperature characteristics of batteries.

Name (block capitals) Lijie Li (Internal Examiner)

Signature  Date 30 May 2022

3. JOINT REPORT BY EXTERNAL AND INTERNAL EXAMINERS

The examiners are invited to provide a brief joint report after the oral examination has concluded.

The report should draw together any disparate views on the thesis which may have been expressed by the examiners in their individual reports. A brief agreed view on the candidate's principal strengths and weaknesses, the approach to the topic, and on the performance at the oral examination might also be expressed.

The joint report might also comment on any difficulties experienced during the examination process and, especially in the case of unsuccessful candidatures, on the manner in which the examination was conducted and on whether the candidate was given the opportunity to draw the examining board's attention to any particular circumstances which might have affected his/her performance.

The thesis presents an experimental study of temperature-dependent battery characteristics and claims that the results validate the theories developed by Joseph Newman in regard to his energy machine. These theories are open to debate, have not been independently validated in a scientifically rigorous manner, and are not accepted by the mainstream research community. Any evidence presented to support these theories must therefore be extensive, accurate, repeatable and clearly related to the specific claims made. The examiners agree that the work presented does not meet these requirements. The experiment data has limited accuracy and the format of the investigations allows multiple interpretations of the results. Various scientific theories are presented but then applied in error to unrelated phenomena.

During his explanations, the student came across as defensive, aggravated and at times condescending. Agreement on many discussion points were difficult to achieve.

The examiners were made aware of difficulties faced by the student in getting access to university laboratories and note the significant disruption caused by COVID restrictions. These were taken into account when deciding to allow the student to re-submit their work.

Specific requirements for the resubmission of this thesis are provided as an Addendum to this Report.

Signature W.D. W. Danage (External Examiner)

Signature Lijie (Internal Examiner)


Date 30/05/2022

4. REPORT BY THE CHAIR OF EXAMINING BOARD

The Chair of Examining Board should ensure that the correct documentation was supplied in good time to the examiners and that a pre-viva meeting was held to allow the examiners to compare notes on their reports and agree a strategy for the viva. The Chair should meet with the student prior to the viva in order to ascertain if there are any extenuating circumstances and inform the examiners if necessary.

The Chair should ensure that the examiners and the student are aware of the University regulations and guides dealing with the examination of a research thesis and should explain the structure of the oral examination and clarify the roles of the examiners and any other individuals present. The Chair should ensure that the examination is conducted in a fair and open manner.

At the end of the viva, the Chair should inform the candidate of the recommendation of the Examining Board and explain the implications of the recommendation. The date for providing corrections or for resubmitting should be confirmed.

| | | | |
|---|-----|-----------------------------|---|
| Name of Supervisor: Augustine Egwebe | | Present (Y / N) No | |
| Were there other individuals present? (Y / N) If so, approved by student and Examiners (initials) in the right hand box. Y | | Name: | Initials: |
| Approved by student? Ms Barbara Down attended at the request of the student | | (Y / N) Y | Initials: |
| Start Time | 1pm | End Time | 4pm |
| As per requirements, did the Chair meet with the candidate prior to the viva? | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| If NO, why was no meeting held? | | | |
| If YES, did the candidate raise any extenuating circumstances they wished to be taken into account? | | | <input type="checkbox"/> Yes <input type="checkbox"/> No |
| If YES, what were these circumstances? student was unable to access labs following COVID restrictions | | | |
| Was the purpose and structure of the viva explained to the candidate? | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Was the role of the examiners explained to the candidate? | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Was the viva examination conducted according to University Regulations? | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| Do you have any concern(s) about how the viva examination was conducted? | | | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No |
| If YES, please state: | | | |
| Were both examiners in agreement on the outcome of the viva examination for the candidate? | | | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No |
| If NO, what was the nature of the disagreement? | | | |
| How has the disagreement been resolved? | | | |
| If the Student is required to submit minor corrections/major amendments, who is responsible for checking these? Internal examiner only <input type="checkbox"/> External examiner only <input type="checkbox"/> Both Internal and External Examiner <input checked="" type="checkbox"/> | | | |
| Name (Block Capitals): HUW SUMMERS | | | Chair of Examining Board |
| Signature:  | | Date: 30/05/2022 | |

5. CONFIRMATION OF ADDRESS

| | |
|--|---------------------|
| Student Name: | Geoffrey Blanche |
| <p>Please ask the student to provide an address to which they would like their certificate sent. Please also advise the student that it is their responsibility to inform Academic Services should their address change.</p> <p>If the student would like to change the address to which their certificate is sent please ask them to contact: assessmentawards@swansea.ac.uk</p> | |
| House/Flat Number | South Rogeston Farm |
| Street Name | Portfield Gate |
| Town/City | Haverfordwest |
| Country | United Kingdom |
| Postal Code | SA62 3LF |

SWANSEA UNIVERSITY

RESULT FORM

6. Surname of Candidate Blanche
Forenames of Candidate (in full) Geoffrey
Student Number 946484
College Engineering
Title of Thesis An Investigation of the Photoelectric Effect to the Endothermic Electric Effect during the Electric Field Charge

The Examining Board, after consideration of the work presented for the degree of **Master of Arts by Research / Master of Science by Research** by the above-named candidate recommend: *[please indicate one only of the following options below; clarification and guidance on each is provided in the "Guide to the Examination of Research Students".]* (tick box)

☐ (1) **Pass – no corrections**
(1 month to submit hard-bound copies)

Definition : The thesis is deemed to be of Master of Arts by Research (MA by Research) and Master of Science by Research (MSc by Research) standard in terms of substance and structure.

☐ (2) **Minor corrections to be submitted within 3 months; Pass**
(Normally to be approved by the internal examiner)

Definition: The thesis is deemed to be of MA by Research / MSc by Research standard in terms of substance and structure; corrections concern matters of detail. No further research work or any other substantial work needs to be conducted. Minor corrections typically include typos, clarifying points, rephrasing, editing, adding paragraphs and correcting references.

☐ (3)† **Substantial corrections and/or amendments being submitted within 6 months; Pass**
This is not an option for resubmitted theses
(Normally to be approved by internal and external examiner, or at the discretion of the examining board by the internal examiner only)

Definition : The thesis is deemed to be of MA by Research / MSc by Research standard in terms of substance, but in order to pass, significant but clearly specifiable and quantifiable amendments are required in terms of a) the presentation of research, e.g. concerning introduction/conclusion; or b) the structure, e.g. concerning the rearranging of data/sections/chapters; or c) the addition of new material not exceeding one chapter in length – where such amendments are judged by the examining board to be achievable within a 6 month period.

☒ (4)† **Decision suspended pending re-examination following re-submission within 12 months**
This is not an option for re-submitted theses
(Normally to be re-examined by the same team of internal and external examiners. As a rule, there will be a second viva; however upon inspection of the re-submitted thesis, examiners may use their discretion to waive the second viva)

Definition: The thesis is not deemed to be of MA by Research / MSc by Research standard in its present form; however, in terms of substance, there is real potential, on the basis of what has already been presented, that the candidate could, within a period of 12 months, present a thesis of appropriate standard; amendments/alterations/additions required may concern both substance and presentation.

☐ (5) **Fail; Not approved for the award or a lower research degree**
(As immediate option and option after re-submission)

Definition: The thesis as presented and defended is not deemed to be of MA by Research / MSc by Research standard actually or potentially.

† Options (3) and (4) are not applicable when a re-submitted work is being examined.

SWANSEA UNIVERSITY

RESULT FORM

Information to Accompany the Outcomes of Examination for the above Degrees

1. NB. If the corrections, amendments or re-submission stipulated are not completed to the satisfaction of the examiners or not submitted for scrutiny within the given time period, then the candidate will be judged to have failed and will be not approved for the award of a degree.
2. Where a re-submission is stipulated, Candidates must pay the relevant re-submission fee.
3. A candidate may be allowed a single opportunity to re-submit the work.

Signature W.D. W. Llanegw (External Examiner)

Signature Lijie (Internal Examiner)

Signature [Signature] (Chair of Examining Board)

Date 30/05/2022