Ananya Maddegalla, Ph.D. Graduate in Chemistry

Department of Chemistry, Bar-Ilan University, Israel. | +972-58 766-5251 | maddega@biu.ac.il

Summary

I have 5 years of experience in battery electrochemistry, specializing in DOE, testing, and analyzing cell performance for Magnesium anode, cathode, and non-aqueous Mg electrolyte chemistries for Rechargeable Mg batteries. Additionally, I have preliminary experience in Li-ion and Na-ion batteries beyond my Ph.D. thesis work. I am an expert in pre- and post-physical, chemical data characterization, electrode fabrication, and validation of material performance for coin cell and 3-electrode cell systems.

Education

Bar-Ilan University (BIU), Israel (2018-2023)
Ph.D. in Chemistry
Thesis advisor: Assoc. Prof. Malachi Noked
Thesis: Anode and Electrolytes for Rechargeable Magnesium Batteries.

Indian Institute of Science (IISc), India (2013-2018)
M.Sc. in Chemistry
B.Sc.(R) in Chemistry and Materials Science

Skills & Abilities

- ***Battery Fabrication*:** Biologic- VSP-300, BCS, VSP, Neware, and Palmsens Electrochemical testing, Three-electrode Cell and Coin Cell Fabrication. **(Expert)**
- ***Electrochemical Techniques:*** CV, CP, CA, GPCL, GITT, Rate studies, dQ/dV **(Expert)**
- ***Lab equipment*:** Glovebox maintainence Electrode Preparation, Calendaring, Slurry Mixing, Vacuum Lines, Schlenk synthesis, High Temp. Furnaces, Atomic Layer Deposition (ALD). **(Expert)**
- ***Instrumentation Techniques*:** Cross-sectional TEMs analysis, certified SEM and HR-SEM operator, Cross-sectional FIB analysis, Powder X-ray Diffraction, X-ray Fluorescence, Inductively-coupled plasma mass spectrometry (ICP-MS), Single Crystal-XRD, NMR spectroscopy, UV-Vis-IR spectroscopy, X-ray Photoelectric spectroscopy, Raman Spectroscopy. **(Expert)**
- ***Digital Skills:*** Microsoft Office | EC-LAB | PalmSens4 | Neware BTS | Top-spin | Origin Data Analysis and Graphing Software - OriginLab Stagraphics | Software for Chemistry (TopSpin, Olex, Chemdraw) | X'pert HighScore (X-ray analysis) | XPS peak fitting (XPSPEAK4.1) | Atomic Layer Deposition (ALD) **(Expert)**

Experience

PH.D. GRADUATE IN CHEMISTRY| ELECTROCHEMISTRY | OCTOBER 2018- OCTOBER 2023.

Ph.D. Thesis: Magnesium Alloy Anode and Crystallized Organo-Halo Aluminate Magnesium Electrolyte solutions for Rechargeable Magnesium-Ion batteries.

Leading development of electrodes (anode and cathode) and crystallized electrolytes in rechargeable magnesium-ion batteries for next-generation EVs.

- Led, developed, DOE of protective layer coating via atomic layer deposition (ALD) on current collectors for rechargeable Mg batteries. (Manuscript under preparation)
- DOE and chemical and analytical investigation on the effect of polydentate ethers on the structure and electrochemistry of bridge magnesium phenyl aluminates. The novel approach for synthesis of the $MgCl^{+}$ and Mg^{2+} cationic electrolytes. (Manuscript under preparation)
- Led, developed, optimized DOE of various organometallic complex Mg electrolyte formulation to investigate the key factor effecting electrochemical Mg stripping/plating and widening the electrochemical window and reversibility, and validating cell performance using Chevrel phase cathode in Mg ion batteries. (Electrochimia Acta, 2023, https://doi.org/10.1016/j.electacta.2023.142869)
- Led role in designing, synthesizing and evaluation of electrolyte structure and electrochemical response in ethereal solvents for Mg electrolytes. (Electrochimia Acta, 2023, https://doi.org/10.1016/j.electacta.2023.142413)
- Investigated and evaluated the electrochemical corrosion of current collectors in Mg electrolytes. (J. Electrochemical Soc., 2021, https://doi.org/10.1149/1945-7111/ac1cc8)
- Led role in evaluating, electrochemical and analytical testing, and validating performance and feasibility of thin film alloy Mg anodes as a potential candidate for replacement of Mg metal anode for Mg-ion batteries.(ChemSusChem, 2021, https://doi.org/10.1002/cssc.202101323)

M.SC IN CHEMISTRY| MATERIAL RESEARCH CENTRE (MRC), IISC, INIDA.

Graduate research intern for developing Metal-Organic Frameworks (MOF) as electrocatalyst for overall water splitting. (May 2017-May 2018)

- I joined Prof. K.K. Nanda group, in MRC department at IISc, to work on my master thesis to develop and design metal organic framework s (MOF) using solid state and hydrothermal syntheis.
- I started my thesis work by designing, synthesizing and later evaluating optical and physical properties of MOF/Metalloprotein hybrid derived carbon nanotubes under the guidance of Ph.D. graduate student of Prof Nanda.
- My role included data acquisition and evaluation of electrocatalysts for oxygen evolution/reduction and hydrogen evolution reactions.
- Documentation of my research output including analysis and interpretation of all data, maintaining records and databases, and drafting technical/progress reports for master's dissertation.

B.SC (RESEARCH) IN CHEMISTRY AND MATERIAL SCIENCE | MRC, IISC, INDIA.

Undergraduate research intern for developing carbon nanoparticles for various applications. (May 2014- March 2017)

- I joined Prof. K.K. Nanda group, in MRC department at IISc, to work on my bachelor's thesis to develop and design and synthesis 0-D and 1-D carbon nanoparticles via hydrothermal synthesis technique .
- I participated in synthesis and characterization optical and physical properties of carbon nanoparticles. (New Journal of Chemistry, 2017, https://doi.org/10.1039/C7NJ02901B).
- My roles included contributing to data acquisition and evaluation for detection of copper trace metal-ion and bioimaging application.

- As an undergraduate intern I documented my research outputs including physical and chemical characterization and interpretation of all data, maintaining records and databases for my undergraduate thesis.

Accolades

- Member of **European Magnesium Interactive Battery Community (E-Magic).** 1 Jan 2019 – Present.
- Recipient of **Milgat Hanasi, Presidential Scholarship for doctoral students** at Bar-Ilan University, Israel. 2018 – Present.
- **Kishore Vigyanik Prothsahan Yojana (KVPY).** 2013-2018 All India Rank – 9. Scholarship Award for the students pursuing Bachelor's and Master of Science in India, funded by the Department of Science and Technology (DST), India.

Social Media

- https://www.linkedin.com/in/ananya-maddegalla-5b1582b9/
- https://scholar.google.com/citations?user=alQWAXUAAAAJ&hl=en
- https://www.researchgate.net/profile/Ananya-Maddegalla

Languages

- ENGLISH : Proficient
- HINDI : Proficient
- TELUGU : Mother tongue

References

- Assoc. Prof. Malachi Noked, Department of Chemistry, Bar-Ilan University, Israel. Malachi.Noked@biu.ac.il, https://scholar.google.com/citations?user=sjk0vNQAAAAJ&hl=en

- Prof. Doron Aurbach, Department of Chemistry, Bar-Ilan University, Israel. Doron.Aurbach@biu.ac.il, https://scholar.google.co.il/citations?user=IwxntTAAAAAJ&hl=en