Electrochemical Energy | Water Laboratory
Faculty of Mechanical Engineering

Seeking a M.Sc. student for redox flow battery development

The laboratory of Professor Matthew Suss at the Technion is focused on developing ***novel flow electrochemical systems*** to push the boundaries in energy storage and water desalination. Currently 17 members, we develop high-performance flow batteries, capacitive deionization cells, and study electrochemistry, transport, and nanoscale phenomena in porous electrodes.

We recently completed the first step and published a paper regarding developing next-generation membraneless zinc-bromine redox flow batteries. We are looking for a motivated student to continue this effort through *a* ***two-year M.Sc.position***. Experimental experience with electrochemical systems is a plus. Interested candidates should submit their CV and grades transcript to Prof. Suss at mesuss@technion.ac.il

Zinc and bromine are abundantly available world-wide, and their reaction chemistry is simple. As such, the $ZnBr_2$-Br_2 battery can successfully fill the important niche in the renewable energy incorporation into the electrical grid by providing a cost-effective technology for the renewable energy storage during wind and sun active periods and shifting its consumption to periods of high demand, thus relaxing transmission and distribution requirements and reducing the need for fossil fuel burning plants. Yet further optimization of the $ZnBr_2$-Br_2 battery is still required, especially regarding a solution for zinc corrosion which leads to poor coulombic efficiency. A determination of the optimal electrolyte composition (salts, complexing agents, surfactants, etc.) and its flow conditions through the battery channel are required to complete the task.

Major Duties/Responsibilities

- Design and fabrication of novel flow batteries using CAD software and in-lab rapid prototyping equipment.
- Performing electrode and battery characterization experiments and analysis (such as charge/discharge, polarization curve experiments, cyclic voltammetry, electrochemical impedance spectroscopy).
- Electrolyte development work including use of complexing and other additives.

Minimum requirements

1. B. Sc. in engineering or science (mechanical, chemical, material engineering, or chemistry preferred).
2. Ability to excel in a fast-paced team environment and high-level English skills (oral and written).

Information on the Principal Investigator

Prof. Matthew Suss obtained his PhD in Mechanical Engineering in 2013 from Stanford University. From 2010-2013, he was a Lawrence Scholar at Lawrence Livermore National Laboratory, and from 2013 to 2014 a Postdoctoral Associate in Chemical Engineering at MIT. Matthew has co-authored 45 scientific publications, 10 patent applications, and delivered over a dozen plenary, keynote, or invited lectures at leading international conferences. Matthew is currently an Associate Professor with tenure in Mechanical Engineering at Technion and affiliated with the Grand Technion Energy Program (GTEP). Matthew has been awarded (in the past five years) the prestigious Alon Fellowship, the Uzi & Michal Halevy Award for Innovative Applied Engineering, and an ARCHES award for research cooperation and high excellence in science.

*Shanghai University ranking.