

NDnano Summer Undergraduate Research 2016 Project Summary

1. Student name: Vasu Tekriwala
2. Faculty mentor name: Dr. Jennifer Schaefer
3. Project title: Polymer Electrolytes for Advanced Rechargeable Batteries
4. Briefly describe any new skills you acquired during your summer research:

I on the outset experienced how to work in a research lab for the first time and learnt how to approach problems in a lab setting. More specifically I learnt how to make coin cells, sample cells and do various characteristic testing on them. I also learnt how to make polymer electrolyte films of various specifications.

5. Briefly share a practical application/end use of your research:

If viable polymer electrolytes can increase the thermal stability of magnesium batteries which may be used in future in Electric Vehicles

Begin two-paragraph project summary here (~ one type-written page) to describe problem and project goal and your activities / results:

The problem on a whole is to search for suitable electrolytes so that making and operating Mg batteries becomes viable. This is lucrative because Mg has twice the energy density at a lower cost compared to Li ion batteries and is also safer. More specifically my work was on using a polymer base with salts already showing good results for Mg so that the thermal stability can be enhanced for the electrolytes. I made 2 sets of electrolyte films of various salt concentrations, one set was $\text{Mg}(\text{HMDS})_2 + \text{PEO}$ and the other was $\text{Mg}(\text{HMDS})_2 + \text{MgCl}_2 + \text{PEO}$, both were made in a solution form with Toluene and acetonitrile as solvents which were dried to make the electrolyte films. Then these films were tested for conductivity in a sample cell. Cyclic voltammetry and galvanostatic measurements were also taken by making coin cells with Mg Electrodes.

The conductivity was of the order 10^{-6} S/cm at 90 C and CV and galvanostatic measurements did not see electrolytic activity.

Publications (papers/posters/presentations):

I presented once in our weekly held group meeting.