

CHEMISTRY Departmental Seminar

Fall 2017
CHEM 285 Schedule
Tuesdays at 4:30-5:45PM
Room Duncan Hall 250

November 21, 2017

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MS Final Oral Seminar

Preparation and the characterization of a ferrocene containing main-chain PEG-CNTs phase for hybrid supercapacitor application

With the rapid development of the global economy, the depletion of fossil fuels and increasing environmental pollution, there is an urgent need for new technologies associated with energy conversion and storage. Supercapacitors have attracted tremendous attention and are the emerging technology for energy storage as they charge and discharge quickly for high power demands but have low energy density. The goal of the research was to synthesize electrode and electrolyte materials for the fabrication of hybrid supercapacitor cell with high energy density. In this hybrid cell, carbon nanotubes were used as electrodes which contributed for electrostatic capacitance and redox additive polymer as electrolytes which accounted for redox or faradaic capacitance, thus increasing the energy density. For the reduction half-cell, ferrocene dicarboxylic acid was polymerized with polyethylene glycol phase for electrolyte. The electrolyte for oxidation half-cell was viologen-PEG polymer, prepared by lab colleague, Rana Kanishka. The hybrid cell using these materials was fabricated in a sandwich model configuration. Further, electrochemical experiments were employed for investigating the performance of the cell. In conclusion, the battery materials showed excellent electrochemical behavior and were appropriate for this type of hybrid cell.