CORE-CM SEMINAR
Michigan State University

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Development of metal-oxide clusters as charge-carriers for nonaqueous redoxflow batteries

Effective integration of renewable energy from intermittent sources (i.e. solar and wind) requires the development of efficient energy storage systems which can function in tandem with the electrical grid. Non-aqueous redox-flow batteries have emerged as promising systems for large-capacity, reversible energy storage capable of meeting the variable demands of the electrical grid. The use of non-aqueous solvents increases the energy density of these systems, however there are few electrolytes with sufficient solubility and electrochemical stability to function in organic media. In this work, we investigate the potential for Lindqvist polyoxovanadatealkoxide (POV-alkoxide) clusters to serve as both the anolyte and catholyte for symmetric, non-aqueous redox-flow batteries. POV-alkoxide clusters display numerous, highly reversible redox events, and demonstrate significant solubility and electrochemical stability in organic solvents. These bulky compounds also demonstrate the ability to mitigate species crossover and membrane fouling, thereby improving the energy efficiency and lifetime of flow battery cells. The application of POV-alkoxides as electrolytes in organic media demonstrates that the remarkable redox properties of multimetallic clusters can be harnessed for non-aqueous energy storage applications, and represents an important new direction for the generation of high performance redox-flow batteries.

Thursday, October 24, 2019
12:00 NOON*
Room 1400 – Biomedical & Physical Sciences
Professor Rémi Beaulac- Host

*Refreshments starting at 11:45 a.m.