Department of **Materials Science & Engineering** seminar series 2019

Redox Targeting-based Vanadium Flow Battery for Advanced Large-scale Energy Storage

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Date: **19th Sep 2019, Thursday**
Time: **3:30 to 4:00 pm**
Venue: **EA-06-03**

Abstract

Vanadium flow batteries (VFBs) have been regarded as a promising technology for large-scale energy storage (i.e. for smart grid, PV/wind farm, household application, etc.). However, due to the intrinsic properties of the aqueous electrolyte, VFBs possess low energy density, limited working temperature and relatively high cost which impede its deployment for real-life application. To address these issues, based on the redox-targeting concept, we have incorporated solid energy storage material, Prussian blue analogues into the electrolyte. The solid material is molded into porous stacking mesh structure using 3D printing to increase both its utilization and reaction kinetics. In such a way, energy is mainly stored in low-cost solid materials, which are kept in tanks, while power is produced from the cell stack when the redox electrolytes are circulated through the storage tanks and regenerated via redox targeting reactions with the materials. By replacing part of the vanadium species with the solid energy storage materials, the concentration of the electrolyte can be significantly decreased in our system while without compromising the energy density. Therefore, we could lower the cost of the battery and widen the working temperature up to 70 degrees Celsius. This work will bring a great leap in the development and commercialization of the VFB technology

Wang Xun received her bachelor's degree in the Department of Materials Science and Engineering (MSE) from National University of Singapore. He is now a Ph.D. candidate in Department of MSE under A/P Wang Qing. His current research mainly focuses on Aqueous redox flow batteries.

ALL ARE WELCOME!

Host: A/P Xue Junmin