



Faculty of Engineering and Applied Science Chemical Engineering Seminar Series



Flow Batteries for Large Scale Energy Storage: Making, Measuring and Modeling Novel Electrodes

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ABSTRACT

Energy storage is now recognized as a key requirement for a truly renewable energy economy. The intermittency of wind and solar, or more specifically the mismatch between natural supply and consumer demand means it simply not possible to reach 100% renewables. One of the leading options for grid-scale energy storage is the redox flow battery. In these systems, a liquid solution of dissolved electroactive ions is pumped through an electrochemical reactor where it is oxidized or reduced to store or release energy. A key component of these systems is the porous electrode where the redox reaction occurs. They must meet several performance criteria including high surface area for reactions, low pressure drop for flow, conductive to electrons, chemically resistant, and mechanical stability. Carbon fiber mats or felts are one of the few materials that can even approach these targets. The development of these materials is in early stages, and significant gains can still be made. This presentation will report on efforts by our group to design an optimized electrode structure for these applications, and our attempts to actually make and test such a material.