Iron Flow Batteries for Grid-Scale Energy Storage

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Large-scale energy storage is required to meet a multitude of current energy challenges. These challenges include modernizing the grid, incorporating intermittent renewable energy sources (so as to dispatch continuous electrical energy), improving the efficiency of electricity transmission and distribution, and providing flexibility of storage independent of geographical and geological location. In addition, such storage should be scalable for centralized or distributed use.
Through efforts supported by ARPA-E and the Department of Energy Office of Electricity, the technology approach we are developing is based on using very low cost iron electrolytes in a flow battery that will be economically feasible. Additional advantages of the IFB include abundant, non-toxic, and non-corrosive materials that are used to provide an energy storage solution that has inherently safe operation and is environmentally friendly.
In this presentation I will address some of the challenges of this approach. I will also describe aspects of the research my group is doing on understanding performance and cost of a slurry iron flow battery that decouples power and energy sizing.

Biography:

Dr. Jesse S Wainright is an Associate Research Professor in the Department of Chemical and Biomolecular Engineering at Case Western Reserve University in Cleveland OH. Prior to joining CWRU, Dr. Wainright spent seven years on the research staff at the Standard Oil Co. He has been on the research staff at CWRU for the past 24 years and has published over 50 papers, primarily devoted to membranes, fuel cells and aqueous batteries. He is currently co-P.I. with Prof. Robert F. Savinell for CWRU's efforts in flow battery research, with funding from NSF, DOE and ARPA-E.