Abstract: Widespread adoption of renewable energy is limited by the lack of low-cost long-duration energy storage. Redox flow batteries are an attractive option to provide grid-scale storage because their power and energy components can be scaled independently; however, systems commercialized to date have failed to realize this low-cost potential, primarily because of the cost and performance of the battery chemistry. This talk will discuss how chelating agents such as EDTA complexed with inexpensive metal ions can address many of the challenges associated with aqueous flow battery chemistry. By inhibiting water splitting catalysis at the molecular level, metal-chelate flow batteries can be operated at voltages in excess of 2.1 volts with high efficiency and at neutral pH. In addition, the low cost and commercial availability of the electrolyte materials provide a pathway to facilitate rapid scale-up and deployment at the grid-scale.

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