**Professor Ellen Matson**

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**Title:**Atomically-precise Vanadium Oxide Clusters for Electrochemical Energy Storage and the Production of Chemical Fuels.

**Abstract:**The Matson Group is investigating the synthesis, characterization and reactivity of multimetallic metal-oxide assemblies. Our principle interests rest in the exploration of unique redox properties and cooperative reactivity of heterometallic assemblies for multielectron chemical processes. Here, we report the synthesis and characterization of a family of vanadium oxide clusters, which serve as molecular models for surface-functionalized and doped nanoparticles. These hexavanadate architectures studied by our laboratory are soluble in organic solvent and constitute monodisperse, crystalline systems that can be characterized by 1H NMR, infrared and electronic absorption spectroscopies, as well as cyclic voltammetry and single crystal X-ray diffraction. Our ability to install cationic and anionic dopants in the form of transition metal ions, oxygen-atom vacancies and halide-defect sites allows for the interrogation of electronic phenomenon resulting from these atomically precise modifications. This work furthers our understanding the physicochemical consequences of modifications of surface chemistry of nanoscale systems and the incorporation of elemental dopants, fostering the development of new strategies for storing renewable power (e.g. wind, solar) through its conversion to electrochemical energy and chemical fuels.

**Bio:**Ellen Matson received her PhD in Chemistry from Purdue University in 2013, under the guidance of Suzanne Bart. During her graduate studies, Ellen’s research focused on the synthesis and reactivity of low-valent, uranium alkyl complexes. Her work culminated in two national awards; Ellen was named the 2013 recipient of the Iota Sigma Pi Anna Louise Hoffman Award for Excellence in Graduate Research, and an 2014 American Chemical Society Division of Inorganic Chemistry Young Investigator. Following graduation, Ellen performed her postdoctoral research at the University of Illinois at Urbana-Champaign, in the research group of Alison Fout. In 2015, Ellen started her independent career at the University of Rochester, where she has built a research program focused on the synthesis, reactivity and electrochemical applications of heterometallic polyoxovanadate-alkoxide clusters.