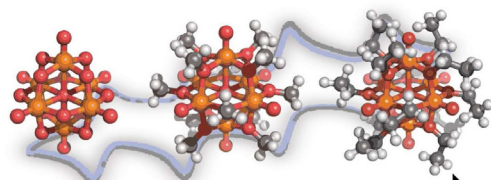


## Lecture abstract

Effective integration of renewable energy from intermittent sources (i.e. solar and wind) requires the development of efficient energy storage systems which can function in tandem with the electrical grid. Non-aqueous redox-flow batteries have emerged as promising systems for large-capacity, reversible energy storage capable of meeting the variable demands of the electrical grid. The use of non-aqueous solvents increases the energy density of these systems, however there are few electrolytes with sufficient solubility and electrochemical stability to function in organic media. In this work, we investigate the potential for Lindqvist polyoxovanadate-alkoxide (POV-alkoxide) clusters to serve as both the anolyte and catholyte for symmetric, non-aqueous redox-flow batteries. POV-alkoxide clusters display numerous, highly reversible redox events, and demonstrate significant solubility and electrochemical stability in organic solvents. These bulky compounds also demonstrate the ability to mitigate species crossover and membrane fouling, thereby improving the energy efficiency and lifetime of flow battery cells. The application of POV-alkoxides as electrolytes in organic media demonstrates that the remarkable redox properties of multimetallic clusters can be harnessed for non-aqueous energy storage applications, and represents an important new direction for the generation of high performance redox-flow batteries.



Evolution of polyoxometalate charge carriers for NRFBs

Installation of bridging alkoxide ligands leads to improvements to solubility, stability and redox profile of POM clusters!!

*Established In Memory of  
Professor Susan A. Odom '03  
(1980 - 2021)*

*UK Chemistry faculty 2011 - 2021*

*Pioneer in renewable energy storage  
and champion of undergraduate  
research.*

**UK** College of Arts  
and Sciences  
*Department of Chemistry*

*chem.as.uky.edu*

# SUSAN ODOM LECTURE



Advances in  
Polyoxovanadate-alkoxide  
Cluster Synthesis with  
Application in Nonaqueous  
Redox-flow Batteries

**DR. ELLEN MATSON**

Associate Professor of Chemistry  
UNIVERSITY OF ROCHESTER



**FRIDAY, OCTOBER 7, 2022**

**2:00 PM**

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**UK** University of  
Kentucky



## DR. SUSAN A. ODOM

Professor Susan Odom was an energetic, productive, and driven faculty member in the Department of Chemistry from 2011 to 2021.

Susan Odom, a native of Paducah, Kentucky, always had an intense sense of curiosity and a passion for science. She attended the University of Kentucky for her undergraduate studies, specializing in organic chemistry and performing research in the development of new materials for organic light-emitting diodes. A highly productive researcher from the start, she was listed as a co-author on four peer-reviewed publications, the lead author on one publication, and was a co-inventor on a royalty-generating patent before completing her undergraduate work. She earned her Ph.D. from the Georgia Institute of Technology, supported by a National Science Foundation (NSF) Doctoral Fellowship to work with Professor Seth Marder, in the development of new charge-transporting materials for flexible electronics. She followed her funding success to earn a Post-Doctoral Fellowship from the NSF to work under Professor Jeffrey Moore at University of Illinois Urbana Champagne in the area of self-healing polymers.

Dr. Odom returned to the University of Kentucky as an Assistant Professor in the Department of Chemistry in 2011, and was tenured and promoted to Associate Professor in 2017. Dr. Odom established herself as an unfaltering proponent of undergraduate and high-school research, hosting numerous students in her laboratory and producing peer reviewed publications from their research efforts. She focused on outreach to younger students and the public, showing for example the strong relationships between science and art. Dr. Odom was a co-organizer of the Expanding Your Horizons program, a STEM conference for middle school girls and their parents, to encourage young women to pursue careers in science and engineering. She also was active in the Kentucky American Council of Education Women's Network, which supports the advancement of women in higher education.

Dr. Odom's established a robust and well-funded research program, serving as the principal investigator or co-investigator on numerous research grants, and served key positions in several large-scale collaborative research efforts. Her main research focus was in the area of power storage; when the often-quoted rail against renewable energy was uttered - 'what happens when the sun doesn't shine or the wind doesn't blow?' - her vocal response was always 'batteries!'. Dr. Odom's research efforts were lauded by the scientific community; from 2017 - 2019, she was a Research Corporation for Scientific Advancement Scialog Fellow for Advanced Energy Storage, and in 2020 she was awarded the American Chemical Society's 'Rising Star Award' from the Women Chemists Committee. Dr. Odom pushed for excellence in every task that she undertook, and this lecture series was established to celebrate her spirit and commitment to excellence in materials chemistry.

The Susan A. Odom Endowment has been established to continue Professor Odom's vision of excellence and diversity in materials research.



## DR. ELLEN MATSON

Ellen was born in Washington D.C. and spent most of her life moving around the world with her family. After graduating from Somers High School (Somers, NY), Ellen attended Boston University, where she participated in the BUCOP program, pursuing simultaneous degrees in Science Education (B.S.) and Chemistry (B.A.). Following graduation, she journeyed out west to begin her graduate work at Purdue University, where she became a founding member of the research group of Suzanne C. Bart. Her thesis was centered around the synthesis and reactivity of low-valent, organouranium complexes. In 2013, she completed her Ph. D. work and began a postdoctoral position in the Fout Laboratory at UIUC, where she studied the development of bioinorganic systems for functional models of nitrite reduction. Ellen is a runner and has completed multiple marathons and half-marathons.