

SPECIAL INORGANIC CHEMISTRY SEMINAR



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“New Approaches to Magnetic Resonance Imaging and Energy Catalysis Through Chemical Design”

Abstract: Synthetic chemistry is a powerful tool for realizing molecules and materials with novel functions for addressing grand challenges in biomedical, environmental, and energy science. This presentation will discuss two avenues by which specific molecular and material functions may be implemented by chemical design to create chemical systems with advanced properties. Part 1: Variation of properties such as temperature, pH, and redox status in the tissue microenvironment is closely associated with a number of biological processes and diseases. Magnetic resonance imaging (MRI) probes that can alter their magnetic properties in response to specific changes in their surrounding environment provide new opportunities for overcoming the current limitations of traditional MRI contrast agents, namely relatively low sensitivity and poor specificity. This presentation will describe the employment of spin-crossover iron complexes for monitoring temperature using ^{19}F NMR chemical shift and dinuclear cobalt complexes for the ratiometric quantitation of solution pH in a non-invasive manner.

Part 2: Global adoption of sustainable energy technologies and chemical industries relies heavily on the efficiency by which small gas molecules such as CO_2 , N_2 , O_2 , and H_2 can be converted to fuels, chemicals, and electricity. Electrocatalysis of such gas molecules driven by renewable energy sources offers a promising route, however, performing such reactions in aqueous environments has been limited by the low solubilities of gases in water. This presentation will describe a strategy for harnessing the high gas capacities of microporous water—aqueous porous liquids comprising microporous nanocrystals—for engendering current enhancement in the electroreduction of O_2 in water.

Friday, January 27th, 2023

UCLA College | Physical Sciences
Chemistry & Biochemistry

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1:00 p.m. | YH4222 - Collaboratory
Yoo Seminar & Conference Hall