

Multimetallic photosensitizers with metal-metal interactions

Dr. Malkanthi Karunananda
Assistant professor of Chemistry,
Saint Louis University, Saint Louis



*Chemistry
Seminar on
bimetallic
photosensitizers*

**Monday
April 27 at 4
pm in 126
Schrenk**

Please contact
Dr. Amitava
Choudhury at
choudhurya@mst.edu
for further
information.

MISSOURI
S&T

Abstract: Photosensitizers that absorb photon energy and after excitation, participate in transfer of energy or electrons have versatile applications in organic synthesis, light-emitting devices, artificial photosynthesis, solar fuel cells, and photodynamic therapies (PDT). The prevailing paradigm in photosensitizer development is the monometallic paradigm that utilizes precious metals such as iridium and ruthenium that are rare, expensive and toxic, and utilizes high-energy wavelengths. The use of high-energy radiation such as ultraviolet (UV) and blue light by these monometallic photosensitizers also leads to various limitations such as low penetration, and the formation of side products.

An attractive alternative to the monometallic paradigm that has emerged recently is the bimetallic paradigm. Many bimetallic systems feature metal-metal bonds and exhibit photo reactivity with low-energy wavelengths complementing the reactivity of the monometallic paradigm and overcome some of its limitations. Here, the synthesis and characterization of a novel class of bimetallic photosensitizers with metal-metal bonds are presented along with an in-depth analysis of their photophysical properties probed by both experimental and computational techniques. The analysis shows that metal-metal cooperativity enhances the properties of the photosensitizers allowing the use of earth-abundant, environmentally friendly metals.

About the speaker: Malkanthi completed her undergrad studies at University of Kelaniya, Sri Lanka majoring in chemistry and graduated with first class honors in 2010. She then joined the PhD program at University of Illinois, Chicago in 2012 and carried out research integrating both experimental and computational chemistry with Prof. Neal Mankad on the development of heterobimetallic catalysts for *E*-selective alkyne semihydrogenation reactions and was awarded the Benjamin B. Freud graduate research fellowship. Upon completion of her thesis work in 2017, she started her postdoctoral work at The Scripps Research Institute with Prof. Keary Engle. Her postdoctoral research was centered on building theoretical models to study mechanisms of regio- and stereoselective alkene functionalization reactions. During her final year, she was awarded the Cottrell Postdoctoral Fellowship and continued her computational work under the co-mentorship of Prof. Kendall Houk, UCLA. In fall 2022, she joined the department of chemistry at Saint Louis University as an Assistant Professor in Chemistry.