



RENEWABLE AND SUSTAINABLE ENERGY INSTITUTE

BIG energy seminar series

Addressing global energy challenges in scale and complexity.

Colloidal Photocatalysis for Energy Conversion and Organic Synthesis

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Professor of Materials Science, by courtesy



Date: Monday, September 14, 2020 at 2pm

Location: <https://cuboulder.zoom.us/j/96235759302>

Abstract:

Colloidal quantum dots (QDs) combine many of the advantages of heterogeneous and homogeneous catalysts. Their broad, intense absorption spectra and sharp emission lines also make them excellent photosensitizers for photocatalysis. But QDs can be more than photosensitizers -- their surfaces, if properly designed, can serve as templates for stereoselective organic reactions or activators of small-molecule substrates for energy conversion reactions. This talk will explore two case studies in colloidal photocatalysis: the regio- and diastereo-selective [2+2] cycloadditions of chalcone-type substrates, and the photoreduction of CO₂ to CO with unprecedented turnover number in pure water.

Bio:

Emily Weiss is the Mark and Nancy Ratner Professor of Chemistry, Professor of Materials Science and Engineering, by courtesy, and the founding Director of the Photo-Sciences Research Center at Northwestern University. Emily earned her PhD from Northwestern in 2005, advised by Mark Ratner and Michael Wasielewski. Her graduate work focused on magnetic superexchange interactions of radical ion pairs created by electron transfer within organic donor-acceptor systems. Emily did postdoctoral research at Harvard University under George M. Whitesides from 2005-2008, and started her independent career at Northwestern in Fall 2008. The objectives of Emily's research group are to understand the mechanisms of conversion of energy from one class to another at interfaces and the behavior of quantum confined systems far from equilibrium, and to design and synthesize nanostructures that are new combinations of organic and inorganic components.

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