

A Nanocrystal Conversion Pathway to Phase-Controlled Multimetallic Electrocatalysts

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**Chemistry
Colloquium on
Engineering
High Entropy
Alloy
Nanocrystal**

**3:00 p.m.
Friday
Oct 9 in
Bertelsmeyer
Hall B10**

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Abstract: High entropy alloys consist of equal or near equal amounts of five or more elements, being stabilized by their high entropy of mixing. Historically, high entropy alloys have been studied as structural materials, but with the development of synthetic pathways to high entropy alloy nanoparticles, their interest as catalysts has been growing. The direct colloidal synthesis of high entropy alloy nanoparticles is challenging given the different conditions under which various precursors must be reduced or decomposed. To address this challenge, a nanocrystal conversion pathway to high entropy alloy nanocrystals has been achieved in which core@shell nanocrystals are colloidally synthesized first and then annealed at elevated temperatures to facilitate intermixing and the formation of the high entropy alloy phase. Moreover, through the design of the precursor core@shell nanocrystals high entropy intermetallic and multi-phase nanoparticles can also be accessed, establishing this nanocrystal conversion pathway as a general strategy to phase-controlled multimetallic nanocrystals. The catalytic performance of these nanocrystals will also be discussed as a function of composition for the oxygen reduction reaction, showing strong dependence on metal identity and degree of intermixing.

About the speaker: Dr. Sara Skrabalak is the James H. Rudy Professor and Robert & Marjorie Mann Chair in the Chemistry Department at Indiana University - Bloomington. She is a recipient of numerous awards, including the 2014 ACS Award in Pure Chemistry and being named a fellow of the American Chemical Society in 2026. She serves as the Director of the NSF Center for Single-Entity Nanochemistry and Nanocrystal Design, which is sponsored by the prestigious Centers for Chemical Innovation Program. In 2020 Professor Skrabalak assumed the roles of Editor in Chief for both *Chemistry of Materials* and *ACS Materials Letters*. Her research group focuses on nanomaterial synthesis and design for applications in catalysis, solar energy use, secured electronics, chemical sensing, and more.