

# JEFFREY I. ZINK INORGANIC CHEMISTRY SEMINAR SERIES



## Professor Yong Yan

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### “Perovskite Semiconductors for Photocatalytic Organic Synthesis”

**Abstract:** Heterogeneous catalysis is responsible for the vast majority of chemical transformations, yet the direct employment of chiral solid catalysts for asymmetric synthesis is mostly overlooked. Our lab proved that photophysical properties of lead halide perovskites already proved for photovoltaics, also should be of interest in photoredox organic synthesis. Because the key aspects of these two applications are both relying on charge separation and transfer. We demonstrated that perovskites nanocrystals are exceptional candidates as photocatalysts, not only for fundamental organic reactions but also active for elusive asymmetric organic synthesis. Chiral 1-phenylethylamine (PEA)-hybridized perovskite PEA/CsPbBr<sub>3</sub> NC photocatalysts exhibit an enantioselective (up to 99% enantiomer excess) avenue to produce N–C axially chiral N-heterocycles, i.e., N-arylindoles from N-arylamine photo-oxidation. Mechanistic investigation indicated a discriminated prochiral binding of the N-arylamine substrates onto the chiral-NC surface with ca. -2.4 kcal/mol enantiodifferentiation. Our perovskite NC heterogeneous catalytic system not only demonstrates a promising strategy to address the long-term challenges in atroposelective pharmaceutical scaffold synthesis but also paves the road to directly employ chiral solids for asymmetric synthesis.

**Meet the Speaker**  
11:45 a.m. | YH 3096

**Wednesday, October 18<sup>th</sup>, 2023**

**UCLA** College | Physical Sciences  
**Chemistry & Biochemistry**

**4:00 p.m. | YH4222 - Collaboratory  
Yoo Seminar & Conference Hall**

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