

JEFFREY I. ZINK INORGANIC CHEMISTRY SEMINAR SERIES



Professor Jonathan Rittle

Department of Chemistry, UC Berkeley

“Discovery of Manganese-Dependent Monooxygenases”

Abstract: The aerobic oxidation of carbon–hydrogen (C–H) bonds in biology is currently known to be accomplished by a limited set of cofactors that largely include heme, nonheme iron, and copper. While manganese cofactors perform difficult oxidation reactions, including water oxidation within Photosystem II, they are generally not known to be used for C–H bond oxidation, and those that do catalyze this important reaction display highly limited intrinsic reactivity. In this seminar, I will describe a handful of homologous enzymes that either require manganese, iron, or mixtures thereof to functionalize strong, aliphatic C–H bonds (BDE = 100 kcal/mol). Structural and spectroscopic studies on these systems reveal redox-active, bimetallic active sites that represent the locus of O₂ activation and substrate coordination. Our combined results dramatically expand the known reactivity of biological manganese–containing cofactors, and suggests that many uncharacterized (or mischaracterized) monooxygenases may similarly utilize manganese to perform crucial oxidative biochemical tasks.

Meet the Speaker

11:45 a.m. | YH 3096

Wednesday, October 9th, 2024
4:00 p.m. | YH4222 - Collaboratory
Dongwon Yoo Seminar &
Conference Hall

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UCLA Chemistry & Biochemistry
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This event is made possible by generous donations from our supporters and also through the gifts of the Bhaumik Centennial Collaboratory, Yoo Seminar & Conference Hall, Tsay Study Lab, and Centennial Collaboratory Donor Wall & Space Funds.