

# Assoc. Prof. Lionel Cheruzel

Department of Chemistry, San Jose State University  
San Jose, CA, USA

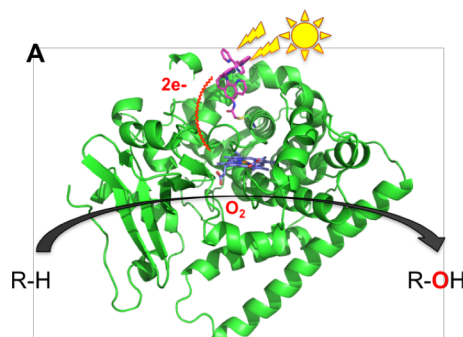


## “Hybrid P450 Enzymes Featuring Ru(II)-diimine Complexes”

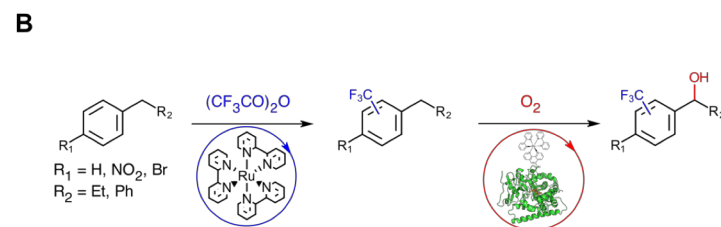
日時：11月28日（水曜）15:10 ~ 16:40

場所：理学部Z103

Our laboratory has developed hybrid P450 enzymes containing a Ru(II)-diimine photosensitizer covalently attached to non-native cysteine residues of P450 heme domains. This approach has enabled to harness their synthetic potential upon visible light excitation.<sup>1</sup> High total turnover



numbers and initial reaction rates were obtained in the light-driven hydroxylation of natural long-chain fatty acid substrates.<sup>2</sup> The crystal structure of the most efficient hybrid enzyme revealed that the photosensitizer is ideally positioned to deliver electrons to the heme active site utilizing the natural electron transfer pathway.<sup>3</sup> Our current efforts in optimizing the biocatalyst photocatalytic activity has included a combination of rational and directed evolution approaches while taking advantages of the unique properties of the Ru(II)-diimine complexes.<sup>4-6</sup> Selected mutants from a directed evolution screen display several folds enhancement in photocatalytic activity towards various substituted arenes. We also probed the effect of systematically varying the para-substituents on the Ru(II)-diimine photosensitizer on the photocatalytic of the hybrid enzymes and gained insights into the rate limiting step of the photocatalytic process.<sup>5</sup> Recently, the merging of photoredox catalysis with the hybrid enzyme approach has enabled the selective light-driven chemoenzymatic trifluoromethylation hydroxylation of a wide range of substituted arenes with exquisite selectivity.<sup>6</sup>



連絡先: 理学研究科 化学専攻 木村哲就 (ext. 5789)  
本セミナーはK-CONNEXのサポートを受けて開催されます