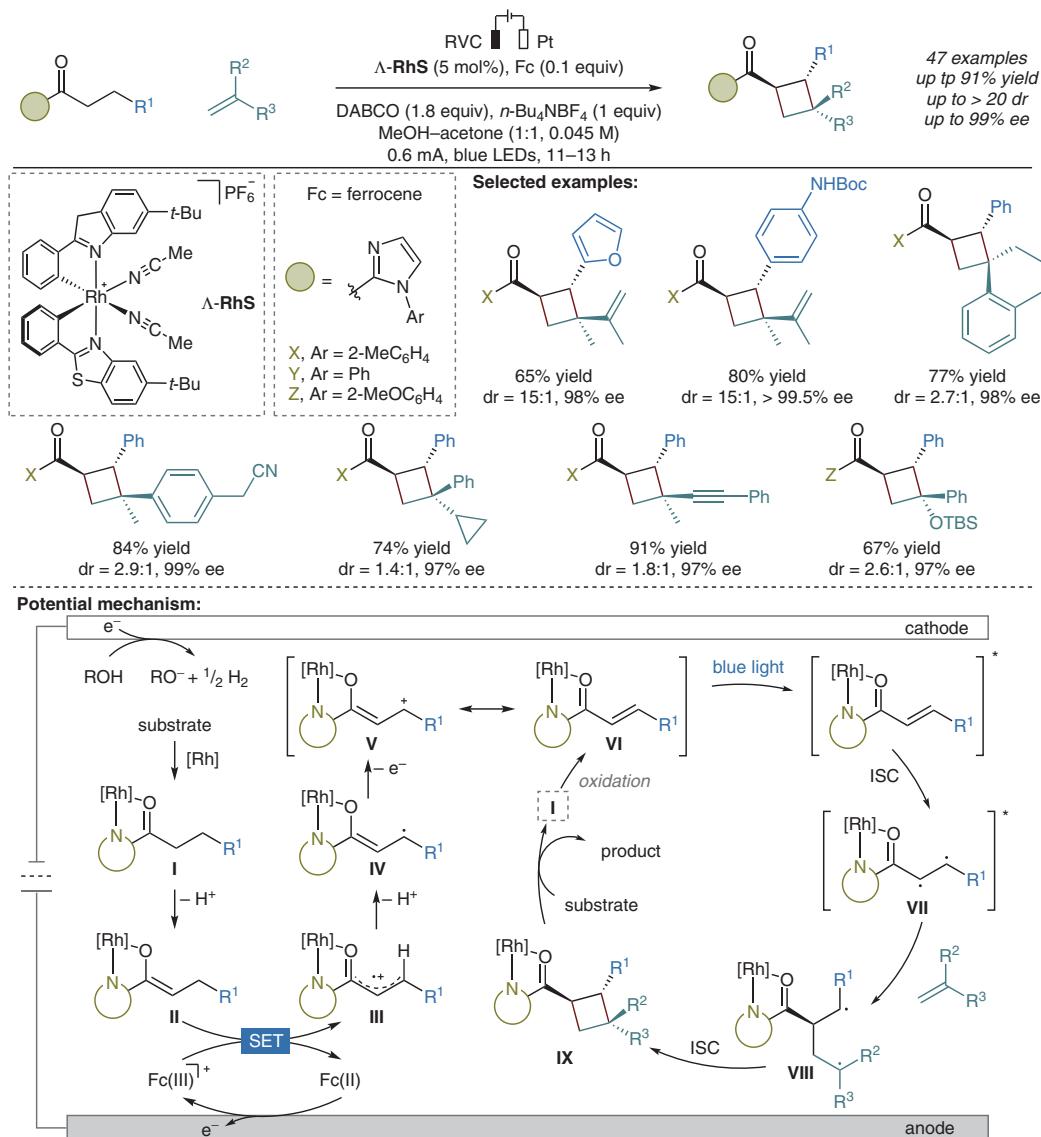


Photoelectrocatalyzed Synthesis of Chiral Cyclobutanes

Synfact of the Month



Significance: Meggers and co-workers describe an enantioselective [2+2] photocycloaddition between alkyl ketones and alkenes to synthesize cyclobutanes. The method utilizes electrocatalysis to activate two C(sp³)–H bonds, and, under blue light irradiation, promotes coupling with two C(sp²) carbons. The procedure highlights a sustainable approach to asymmetric small ring synthesis.

Comment: Alkyl tethered (hetero)aryl ketones and various aryl- and alkyl-substituted alkenes can react in a highly enantioselective fashion. The transformation can be performed on gram-scale. It is proposed that the role of ferrocene serves as a redox mediator to turn over the electrocatalytic system, while a chiral rhodium Lewis acid mediates the dehydrogenation of the ketone (**I** to **VI**) and the subsequent cycloaddition (**VII** to **IX**).