Biomimetic Catalysis in Green Organic Transformations

Jan-E. Bäckvall*

Department of Organic Chemistry, Arrhenius Laboratory, Stockholm University,
SE-106 91 Stockholm, Sweden
jeb@organ.su.se

Carbocyclizations, annulation processes involving carbon-carbon bond formation via carbometalation, constitute an extremely important and useful class of reaction for the syntheses of carbocyclic and heterocyclic compounds. We have recently developed a number of selective palladium-catalyzed oxidative carbocyclizations of unsaturated systems often involving the use of molecular oxygen as the oxidant in a biomimetic approach. Mild oxidative C-C bond formation under aerobic conditions can be achieved via this approach.

We have developed oxidative borylative and arylative carbocyclization of enallenes, allenynes, and bis-allenes as well as C-H activation/carbocyclization of aryllallenes. For some recent applications see refs 1-5.

In another approach to biomimetic catalysis, enzymes have been combined with racemization catalysts for dynamic kinetic resolution. An example of the latter approach is the development of a biomimetic hybrid catalyst that works as an artificial metalloenzyme.

References