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Gain by Strain: Donor-Acceptor Cyclopropanes to Access Carbo- and Heterocyclic Compounds

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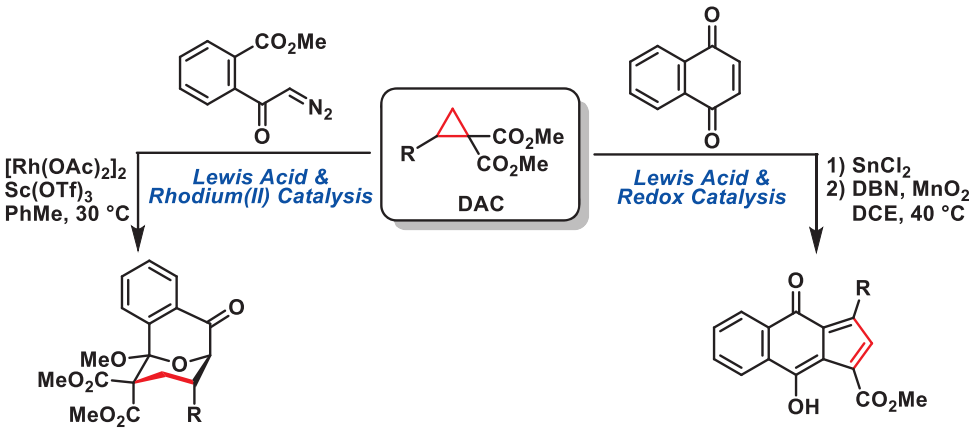
Donor-acceptor cyclopropanes (DACs) are highly strained entities which are unique building blocks for hetero- and carbocyclic systems.[1,2] For the last decade, we have been developing novel methodologies starting from these type of three-membered rings leading to oligopyrroles, chalcogen-containing heterocycles, and 1,3-bisfunctionalized products,[3] just to name a few. To get deeper insights into their intrinsic reactivity in-depth physical organic studies were performed recently.[4]

Besides the common activation of DACs by Lewis acids leading to a wide variety of ring-opening and cycloaddition products even synergistic catalytic approaches can be applied to generate fleeting intermediates which react with the strained systems. Scheme 1 depicts two representative examples, one using Lewis acid and Rh catalysis (affording intermediate carbonyl ylides)[5] and another using Lewis acid and redox catalysis are presented.[6] More recently, electrochemical methods were applied to activate donor-acceptor cyclopropanes.[7]



Scheme 1. Donor-acceptor cyclopropanes in dual catalyses.

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