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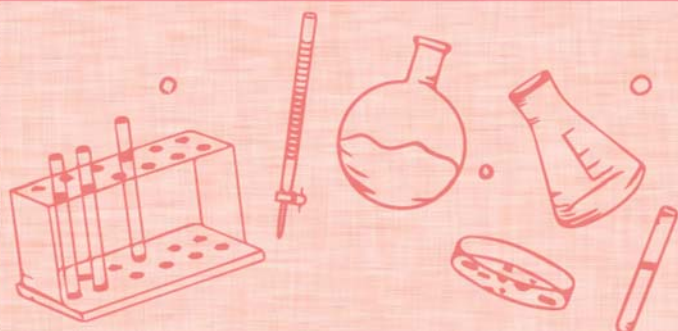


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**Gain by Strain: Donor-
Acceptor Cyclopropanes
to Access Carbo- and
Heterocyclic Compounds**

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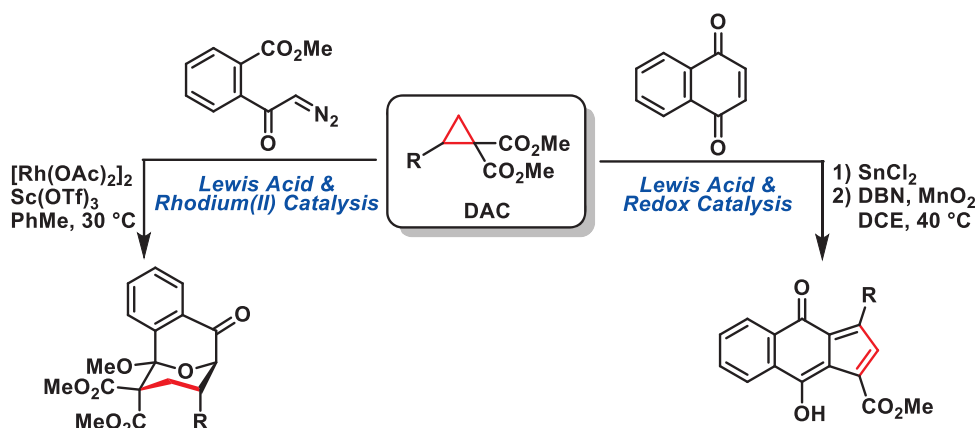
Gain by Strain: Donor-Acceptor Cyclopropanes to Access Carbo- and Heterocyclic Compounds

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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.

[1] H.-U. Reissig, R. Zimmer, *Chem. Rev.* **2003**, *103*, 1151.

[2] T. F. Schneider, J. Kaschel, D. B. Werz, *Angew. Chem. Int. Ed.* **2014**, *53*, 5504.

[3] a) J. Kaschel, T. F. Schneider, D. Kratzert, D. Stalke, D. B. Werz, *Angew. Chem. Int. Ed.* **2012**, *51*, 11153; b) A. U. Augustin, M. Senses, P. G. Jones, D. B. Werz, *Angew. Chem. Int. Ed.* **2017**, *56*, 14293; c) L. K. B. Garve, P. G. Jones, D. B. Werz, *Angew. Chem. Int. Ed.* **2017**, *56*, 9226; d) G. A. Oliver, M. N. Loch, A. U. Augustin, P. Steinbach, M. Shariq, U. K. Tambar, P. G. Jones, C. Bannwarth, D. B. Werz, *Angew. Chem. Int. Ed.* **2021**, *60*, 25825.

[4] A. Kreft, A. Lücht, J. Grunenberg, P. G. Jones, D. B. Werz, *Angew. Chem. Int. Ed.* **2019**, *58*, 1955.

[5] M. Petzold, P. G. Jones, D. B. Werz, *Angew. Chem. Int. Ed.* **2019**, *58*, 6225.

[6] A. Lücht, L. J. Patalag, A. U. Augustin, P. G. Jones, D. B. Werz, *Angew. Chem. Int. Ed.* **2017**, *56*, 10587.

[7] S. Kolb, M. Petzold, F. Brandt, P. G. Jones, C. R. Jacob, D. B. Werz, *Angew. Chem. Int. Ed.* **2021**, *60*, 15928.