A Straightforward Access to the Chiral Cyclopentadienes via Intramolecular Metal Carbene/Carbenoid Cascade Transformations

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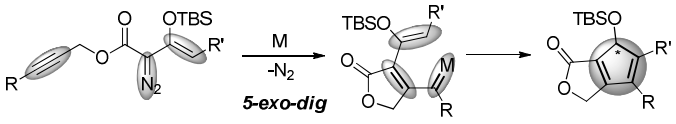
Intramolecular metal carbene cascade reactions are effective and convenient access to construct functionalized cyclic frameworks. In this context, pioneering work was reported by Padwa,[1] and multi-substituted furane derivatives synthesis is the focus via the carbonyl ylide intermediate at that age.[2] Meanwhile, detailed mechanism study was carried out by Hoye and co-workers.[3] Recently, this strategy has been applied to the synthesis of various cyclic frameworks via ending with two kinds of traditional metal carbene reactions:[4] X-H insertion[5] and cyclopropanation.[6] Moreover, Doyle and co-workers have found that cycloaddition reactions could occur with cyclopropene intermediate in the presence of a compatible metal catalyst.[7] Inspired by these works, we designed a intramolecular metal carbene cascade reactions, which is initiated from a metal carbene species generated from the corresponding diazo group, and terminated with an electronic rich alkenyl unite to form a cyclopentadiene derivatives with high to excellent enantioselectivity and high yields via cyclopropene intermediate (Scheme 1). To our best knowledge, although there are types of catalytic asymmetric metal carbene reactions disclosed, there is no asymmetric version reported in the metal carbene cascade reactions.



Scheme 1

Reference:

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