A convenient approach for the generation of N-stabilized oxyallyl cation and its [4+3] cycloaddition reaction

([1]*Graduate School of Pharmaceutical Science, Tokushima University*)
○Sangita Karanjit[1], Aoi Minamide[1], Ryota Sato[1], Kosuke Namba[1]

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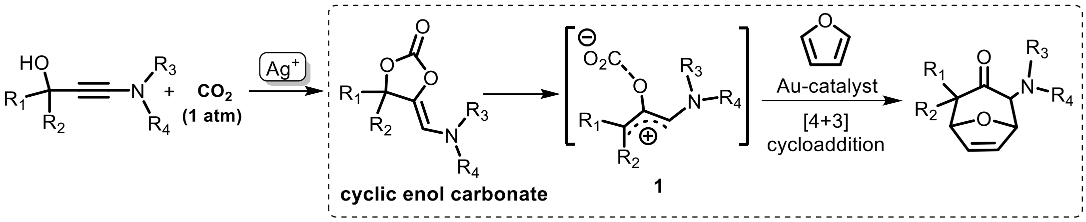
Oxyallyl cations are widely used as intermediates in organic synthesis, such as [4+3] or [3+2] cycloaddition reaction which is a very important and powerful approach for constructing ring systems. Conventionally, oxyallyl cations are generated from α-halo or sulfonyl-substituted ketones or enol ethers which readily react with conjugated dienes or electron rich olefins. With the pioneering work by Murai et al.[1] which opened up the access to the oxyallyl cation from a new source i.e., cyclic enol carbonates, several catalytic transformations via oxyallyl cation intermediate to form C-C bond has been reported.[2] However, there are no reports for the [4+3] cycloaddition reaction via generation of heteroatom-stabilized oxyallyl cation from cyclic enol carbonate. Herein, we presented Au-catalyzed [4+3] cycloaddition reaction of N-stabilized oxyallyl cation **1** with furan via decarboxylation of cyclic carbonates which forms the cyclopentenone core skeleton in many natural products. The cyclic enol carbonates which are the starting material for this decarboxylative transformation were easily prepared from the Ag-catalyzed reaction of CO_2 with propargyl alcohol in good yields using our reusable heterogeneous silver catalyst immobilized on silica support[3] ($Im^+Cl^-@SiO_2$). This decarboxylation strategy is simple, mild, efficient, and green route which involves the elimination of CO_2 as the driving force to generate oxyallyl cation in-situ for the [4+3] cycloaddition reaction to be applied in the construction of bicyclic key intermediates containing cyclopentenone.



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