

# Synthesis of 2-alkenylidene-3-oxoindoles by gold-catalyzed cascade reaction

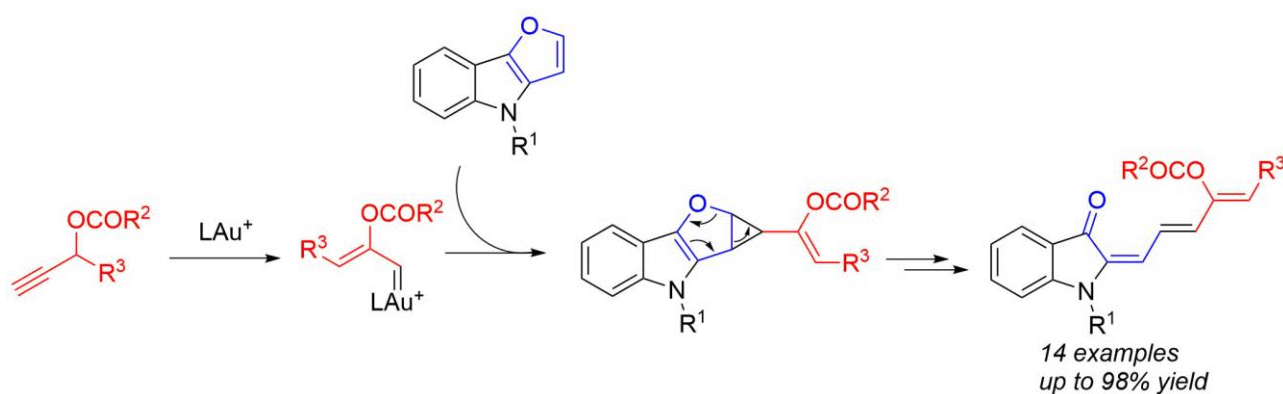
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Homogeneous gold-catalyzed cascade reactions are important and useful process for the synthesis, inter alias, of highly functionalized heterocycles and natural products.<sup>1</sup> In this context, we recently investigated the use of functionalized 4*H*-furo[3,2-*b*]indoles for the synthesis of more complex structures. Thus, 4*H*-furo[3,2-*b*]indoles were explored for the synthesis of 2-spirocyclopentane-1,2-dihydro-3*H*-indolin-3-ones through the addition of gold-activated allenes to the C2 furan moiety.<sup>2</sup>

Herein we present the evolution of this work involving the C2-C3 bond of 4*H*-furo[3,2-*b*]indoles in the reaction with a gold(I)-carbene generated in situ from propargyl esters.<sup>3</sup> In particular, reaction between 4*H*-furo[3,2-*b*]indoles and propargyl esters, performed in presence of gold(I) catalysts, leads to the formation of 2-alkenylidene-3-oxoindoles in a cascade process that includes a double ring opening step. A series of 2-alkenylidene-3-oxoindoles were obtained in good to excellent yields. Optimization of the reaction conditions, scope and proposed reaction mechanism will be illustrated in the poster, together with preliminary photophysical studies.



Scheme 1

[1] a) Furstner, A. *Angew. Chem., Int. Ed.*, **2018**, *57*, 4215; b) Quach, R.; Furkert, D. P.; Brimble, M. A. *Org. Biomol. Chem.*, **2017**, *15*, 3098.

[2] Pirovano, V.; Brambilla, E.; Rizzato, S.; Abbiati, G.; Bozzi, M.; Rossi, E. *J. Org. Chem.*, **2019**, *84*, 5150.

[3] Brambilla, E.; Pirovano, V.; Giannangeli, M.; Abbiati, G.; Caselli, A.; Rossi, E. *Org. Chem. Front.*, **2019**, DOI: 10.1039/C9QO00647H