

The Neglected Brother: Silver Catalyzed Domino Reactions Involving Alkynes

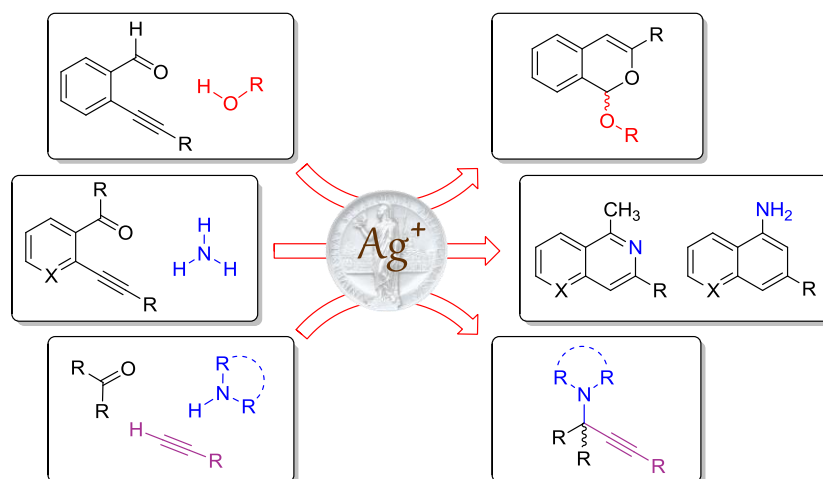
Giorgio Abbiati

*Dipartimento di Scienze Farmaceutiche – Sezione di Chimica Generale e Organica “A. Marchesini”,
Università degli Studi di Milano, via G. Venezian, 21, 20133, Milano, Italy*

e-mail: giorgio.abbiati@unimi.it

Among the noble metals used in homogeneous catalysis, silver is the most neglected one, and only with the new millennium it has been rediscovered as suitable catalyst for a number of different organic transformations¹ including the synthesis of heterocycles.² Beside the versatility of copper catalysts and the much-in-vogue gold catalysis, silver salts and complexes demonstrated to be able to promote a number of reactions involving both σ and π activation. Its ability to act as Lewis acid as well as transition metal can be profitably used to promote domino and multicomponent³ transformations involving multiple bonds and heteroatoms. A certain number of examples in which silver catalysts effectively replaced copper ones or displayed an activity comparable – or higher – than more expensive gold catalysts have been reported.

Here, our recent findings on silver catalyzed domino and multicomponent reactions involving alkynes will be disclosed. In particular, this talk will be focused both on domino addition/annulation reactions of 2-alkynylacetophenone derivatives with ammonia by means of simple silver salts catalysts⁴ and on the activity of some original pyridine-containing tetra-aza macrocyclic silver complexes, called [Ag(I)(Pc-L)],⁵ in two different transformations: the regioselective domino addition/cycloisomerization reaction of 2-alkynylbenzaldehydes with alcohols⁶ and the A³-coupling⁷ multicomponent reaction.



References

1. *Silver in Organic Chemistry* (Ed. M. Harmata), John Wiley and Sons, Inc., Hoboken, 2010.
2. Álvarez-Corral, M.; Muñoz-Dorado, M.; Rodríguez-García, I. *Chem. Rev.* **2008**, *108*, 3174–3198.
3. Abbiati, G.; Rossi, E. *Beilstein J. Org. Chem.* **2014**, *10*, 481–513.
4. Dell'Acqua, M.; Abbiati, G.; Arcadi, A.; Rossi, E. *Org. Biomol. Chem.* **2011**, 7836–7848.
5. Castano, B.; Guidone, S.; Gallo, E.; Ragaini, F.; Casati, N.; Macchi, P.; Sisti, M.; Caselli, A. *Dalton Trans.* **2013**, *42*, 2451–2562.
6. Dell'Acqua, M.; Castano, B.; Cecchini, C.; Pedrazzini, T.; Pirovano, V.; Rossi, E.; Caselli, A.; Abbiati, G. *J. Org. Chem.* **2014**, *79*, 3494–3505.
7. Trose, M.; Dell'Acqua, M.; Pedrazzini, T.; Pirovano, V.; Gallo, E.; Rossi, E.; Caselli, A.; Abbiati, G. *submitted*.