Student Talk

Inter-Disciplinary Explorations in Chemistry (I-DEC 2018)

Synthesis of Multifunctional Diselenides and its catalytic Oxidant Activity

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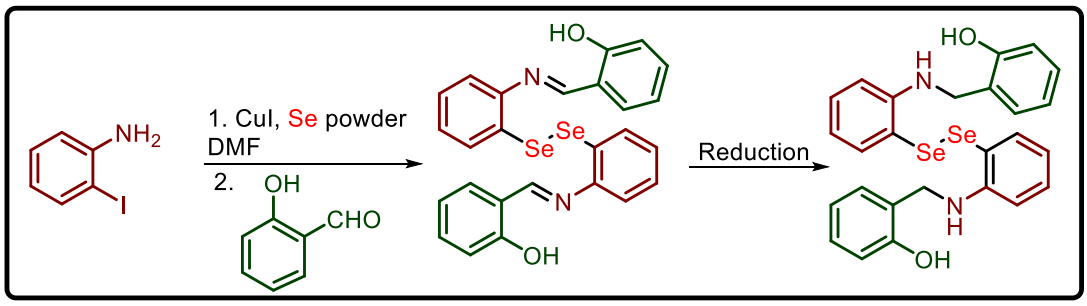
Abstract:

Over the last years, selenium compounds have become very attractive in many fields such as medicine, biology, catalysis, and material science.[1] Several organoselenium compounds have been designed and developed to mimic the functions of GPx and related enzymes[2] and chiral electrophilic selenium catalyst has been made for asymmetric catalysis.[3]

Oxidation reactions are fundamental processes widely applied in organic synthesis. Elemental Selenium and more often its compounds have been successfully used as stoichiometric reagents and catalysis for oxidation of different organic substrates. The very rapid development of synthetic methodology is based mainly on the introduction of a great variety of heterorganic derivatives as reagent and catalysis. Among them an important role is played by selenium compounds[4].

Here we are presenting the synthesis of multifunctional diselenides with efficient methodology. These diselenides catalyse oxidative reaction without any reagent/additive, base and light source.



References and Notes:

(1) Merkel, P. B.; Luo, P.; Dinnocenzo, J. P.; Farid, S. Accurate Oxidation Potentials of Benzene and Biphenyl Derivatives via Electron-Transfer Equilibria and Transient Kinetics. *J. Org. Chem.* **2009**, *74* (15), 5163–5173.

(2) Jain, V. K. *Chapter 1. An Overview of Organoselenium Chemistry: From Fundamentals to Synthesis*; 1970.

(3) Kawamata, Y.; Hashimoto, T.; Maruoka, K. A Chiral Electrophilic Selenium Catalyst for Highly Enantioselective Oxidative Cyclization. *J. Am. Chem. Soc.* **2016**, *138* (16), 5206–5209.

(4) Młochowski, J.; Brząszcz, M.; Giurg, M.; Palus, J.; Wójtowicz, H. Selenium-Promoted Oxidation of Organic Compounds: Reactions and Mechanisms. *European J. Org. Chem.* **2003**, No. 22, 4329–4339.

(5) Mukherjee, A. J.; Zade, S. S.; Singh, H. B.; Sunoj, R. B. Organoselenium Chemistry: Role of Intramolecular Interactions. *Chem. Rev.* **2010**, *110* (7), 4357–4416.

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Bio-Sketch of Speaker

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Aditya Upadhyay is currently doing PhD under the supervision of Professor Sangit Kumar at IISER Bhopal. Aditya has joined IISER Bhopal in 2016. He completed his B.Sc. and M.Sc. from Pandit L.M.S.P.G. Collage, Rishikesh Uttarakhand.

Currently he is pursuing his PhD in Organochalcogen chemistry. His research interest is to synthesize new multifunctional organochalcogen compounds having both soft donor site (e.g. Se) and hard donor site (e.g. N, O) and to explore the catalytic activity of these compounds. These compounds are structurally important due to their intramolecular interaction. So, by the change in substituent of diselenides, its redox properties can be enhanced. So currently he is working on the oxidant behaviour of these diselenides and exploring its catalytic activity in organic transformations.