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PII: S1001-8417(17)30235-8
DOI: http://dx.doi.org/doi:10.1016/j.cclet.2017.06.023
Reference: CCLET 4117

To appear in: *Chinese Chemical Letters*

Received date: 2-5-2017
Revised date: 28-5-2017
Accepted date: 23-6-2017

Please cite this article as: Xian-Long Wang, Hong-Jie Li, Jie Yan, Iodine-mediated regioselective hydroxyselenenylation of alkenes: facile access to β-hydroxy selenides, Chinese Chemical Lettershttp://dx.doi.org/10.1016/j.cclet.2017.06.023

Communication

Iodine-mediated regioselective hydroxyselenenylation of alkenes: facile access to *β*-hydroxy selenides

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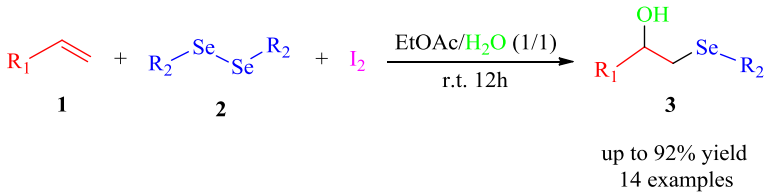
ARTICLE INFO
Article history:
Received 2 May 2017
Received in revised form 16 June 2017
Accepted 20 June 2017
Available online

Graphical abstract



In the presence of molecular iodine, the reaction of alkenes with diselenides proceeds efficiently under mild reaction conditions in MeCN/H_2O, which affording *β*-hydroxy selenides with high regioselectivity and in good to excellent yields.

ABSTRACT

In the presence of molecular iodine, the reaction of alkenes with diselenides proceeds efficiently under air and at room temperature in mixed solvent MeCN/H_2O, which affording *β*-hydroxy selenides with high regioselectivity and in good to excellent yields. This iodine-mediated vicinal difunctionalization of alkenes requires mild reaction conditions and is a simple procedure, which extends the synthetic application of molecular iodine in organic synthesis.

Keywords:β-*Hydroxy selenide, Hydroxyselenenylation, Diselenide, Alkene,* I_2

Recently, the vicinal difunctionalization of alkenes has been increasing in importance for rapidly increasing molecular complexity with a variety of functional groups [1-5]. The hydroxyselenenylation of alkenes is a type of difunctionalization of alkenes, of which, both a selenium atom and hydroxy group can be installed into the carbon–carbon double bond. Due to *β*-hydroxy selenides are valuable intermediates in the synthesis of allylic alcohols [6], olefins [7], bromohydrins [8] vinyl selenides [9, 10], and some important natural compounds [11-13], several methods are available for their preparation. The electrophilic addition of the commercially available selenenylating reagent PhSeCl to alkenes is a useful procedure [14, 15]; however, the presence of toxic and moisture-sensitive nature of it, and the nucleophilic Cl^- anion can give rise to undesirable side processes. Alternatively, some novel reagents which do not contain nucleophilic counterions, such as $PhSeOSO_2Ar$, *N*-phenylselenophtalimide and *N*-phenylselenosuccinimide, have been developed [16-18]. A simpler method for formation of the electrophilic phenylselenium cation is oxidation of less expensive and less toxic diphenyl diselenide with oxidants, like DDQ, iodobenzene diacetate or electrolytic system [19-21]. Using selenolate anions, the S_N2 ring-opening of epoxides is another way for access to *β*-hydroxy selenides. The selenolate anions can be generated by treatment diphenyl diselenide with sodium, zinc, sodium borohydride, zinc/aluminium (III) chloride, tributylphosphine in an alkaline medium