SYNLETT
Spotlight 399

This feature focuses on a reagent chosen by a postgraduate, highlighting the uses and preparation of the reagent in current research

Sodium Selenide

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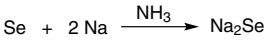
Introduction

Sodium selenide is an odourless white crystalline solid, which is soluble in water. Sodium selenide is very useful in the preparation of a wide variety of selenium-containing heterocycles.[1] It can be used for the synthesis of substituted selenophenes, [2,3] nitroxide annulated 3-amino-2-(ethoxycarbonyl)selenophene,[4] bis(2,4,6-trimethylphenyl)selenide,[5] phosphinodiselenoic acid salt,[6] unsaturated selenacrown ethers,[7] diselenobenzoquinone complexes,[8] and 1,4-dichalcogenanes.[9] In addition, it has been employed in the ring opening of epoxides[10] and γ-butyrolactones.[11]

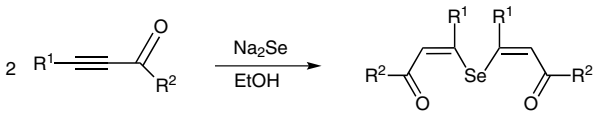
Sodium selenide is commercially available and can be prepared by reduction of elemental selenium with sodium in liquid ammonia (Scheme 1).[12]



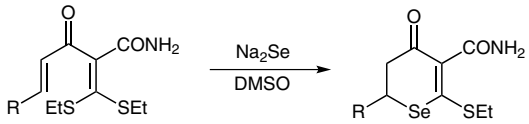
Scheme 1

Abstracts

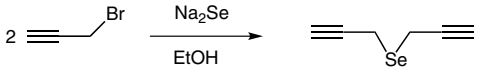
(A) *Synthesis of Functionalized Divinyl Selenides:*
Potapov et al. have found that functionalized divinyl selenides can be synthesized by regio- and stereoselective addition of sodium selenide to ethynyl ketones.[13]



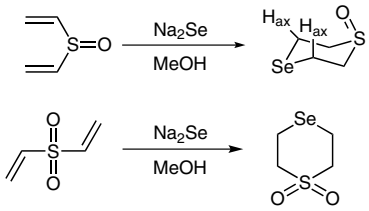
(B) *Synthesis of Selenopyran-3-carboxamide Derivatives:*
The [5+1]-annulation reactions of α-alkenoyl-α-carbamoylketene dithioacetals with Na_2Se afforded highly functionalized selenopyran-3-carboxamide derivatives in high yields.[14]



(C) *Synthesis of Dipropargyl Selenide:*
Amosova et al. have developed a simple and efficient procedure for conversion of propargyl bromide into dipropargyl selenide.[15]



(D) *Synthesis of 1-Thia-4-chalcogenacyclohexane-1-oxides and 1,1-Dioxides:*
Potapov et al. reported that 1-thia-4-chalcogenacyclohexane-1-oxides and 1,1-dioxides can be obtained via the addition of sodium selenide to divinylsulfoxide and sulfone.[16]



SYNLETT 2012, 23, 1847–1848
Advanced online publication: 05.07.2012
DOI: 10.1055/s-0031-1290430; Art ID: ST-2012-V0407-V
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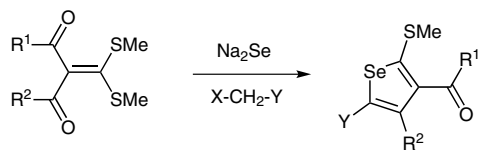
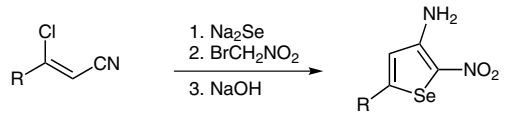
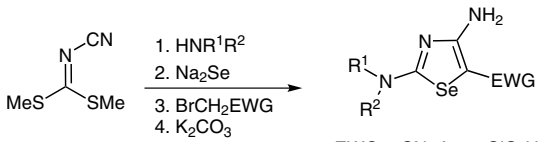
(E) *Synthesis of Substituted Selenophenes:*
Sommen et al. reported a simple and efficient method for the synthesis of various substituted selenophenes. Selenophenes were successfully prepared from ketene dithioacetals and sodium selenide along with ethyl bromoacetate, chloroacetonitrile, chloroacetone and bromoacetophenone in moderate to good yields.[17]



(F) *One-pot Synthesis of Substituted 3-Amino-2-nitroselenophenes:*
One-pot synthesis of substituted 3-amino-2-nitroselenophenes has been achieved via a three-step procedure by using β-chloroacroleins, sodium selenide and bromonitromethane.[18]

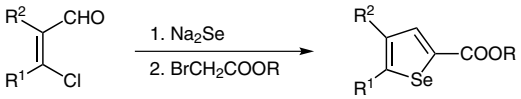


(G) *Synthesis of 2,4,5-Trisubstituted Selenazoles:*
Thomae et al. reported that 2,4,5-trisubstituted selenazoles can be obtained by a one-pot, four-step procedure from azomethine dithioacetals.[19]



EWG = CN, Ac, *p*-ClC$_6$H$_4$CHO

(H) *Synthesis of 2,3,4-Substituted Selenophenes:*
2,3,4-Trisubstituted selenophenes can also be synthesized by a Fiesselmann's reaction implying a β-chloroacrolein, sodium selenide and an alkyl bromoacetate.[20]



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