

This article was downloaded by:

On: 28 January 2011

Access details: *Access Details: Free Access*

Publisher *Taylor & Francis*

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Phosphorus, Sulfur, and Silicon and the Related Elements

Publication details, including instructions for authors and subscription information:

<http://www.informaworld.com/smpp/title~content=t713618290>

Stereoselective Preparation of Bicyclic Seleno and Telluraheterocycles Starting from the Chiral Pool

Oliver Schulze; Jürgen Voss

To cite this Article Schulze, Oliver and Voss, Jürgen(1999) 'Stereoselective Preparation of Bicyclic Seleno and Telluraheterocycles Starting from the Chiral Pool', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 153: 1, 429 — 430

To link to this Article: DOI: 10.1080/10426509908546505

URL: <http://dx.doi.org/10.1080/10426509908546505>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.informaworld.com/terms-and-conditions-of-access.pdf>

This article may be used for research, teaching and private study purposes. Any substantial or systematic reproduction, re-distribution, re-selling, loan or sub-licensing, systematic supply or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

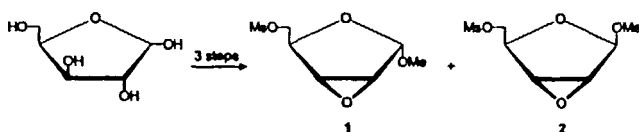
Stereoselective Preparation of Bicyclic Seleno and Telluraheterocycles Starting from the Chiral Pool

OLIVER SCHULZE and JÜRGEN VOSS

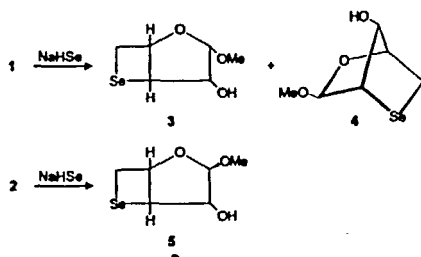
*Institute of Organic Chemistry, University of Hamburg, Martin-Luther-King-Platz
6, D-20146 Hamburg, Germany*

The preparation of seleno- and telluroesters by way of the Mitsunobu reaction[1] is not possible since seleno- and telluroacetic acid are unsuitable reagents. However, sodium hydrogen selenide and telluride can be conveniently prepared as *in situ* reagents. These powerful nucleophiles readily attack methyl 2,3-anhydro-5-*O*-mesyl- α -D-ribo-furanoside (**1**) to yield in a tandem reaction the seleno- (**3**) – (**5**) and tellurabicyclics (**11**) as pure enantiomers.

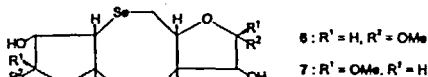
The two 2,3-anhydro-5-*O*-mesylribofuranosides **1** and **2** are obtained from D-Xylose in a three-step synthesis.



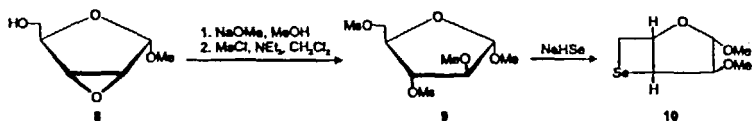
Reaction of **1** and **2** with sodium hydrogen selenide, which is prepared by reduction of grey elemental selenium with sodium borohydride in sodium ethanolate solution, yields the seleno-bicycloheptanes **3** – **5** in a tandem-reaction, *i. e.* first nucleophilic substitution of the mesylate groups by hydrogen selenide and subsequent intramolecular opening of the epoxide ring under formation of the selenetane (**3**, **5**) or selenolane (**4**) moiety.



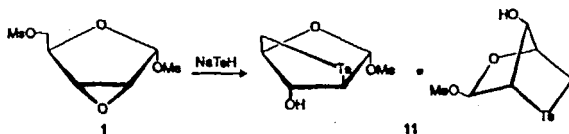
The product ratio 3 : 4 depends on the reaction temperature. No bicyclo[2.2.1]heptane derivative at all is formed from 2, which observation can be explained by steric hindrance of the intramolecular attack on C-2 caused by the β -position of the methoxy groups at C-1. Small amounts of the tricyclic 1,5-diselenocanes 6 and 7 are formed as by-products.



A third selenetane, 10, is obtained from methyl 2,3-anhydro- α -D-ribo-furanoside 8 via the dimesylate 9.



Analogous reaction of 1 with sodium hydrogen telluride – once more prepared *in situ* from elemental tellurium and sodium borohydride – yields the elusive tellurabicyclo[2.2.1]heptane 11.



References

- [1] J. Voss, O. Schulze, F. Olbrich, G. Adiwidjaja, *Phosphorus, Sulfur, Silicon*, **1997**, *120–121*, 389–390.