

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>

2-Seleno- and 2-Telluroimidazolines: Syntheses, Structures and Properties

Norbert Kuhn; Heike Kotowski; Thomas Kratz; Gerald Henkel

To cite this Article Kuhn, Norbert , Kotowski, Heike , Kratz, Thomas and Henkel, Gerald(1998) '2-Seleno- and 2-Telluroimidazolines: Syntheses, Structures and Properties', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 136: 1, 517 — 520

To link to this Article: DOI: 10.1080/10426509808545986

URL: <http://dx.doi.org/10.1080/10426509808545986>

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.

2-SELENO- AND 2-TELLUROIMIDAZOLINES: SYNTHESSES, STRUCTURES AND PROPERTIES

NORBERT KUHN^a, HEIKE KOTOWSKIA,

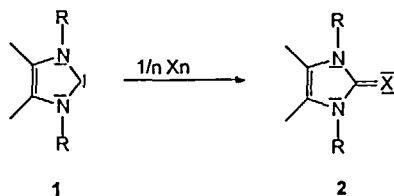
THOMAS KRATZ^a and GERALD HENKEL^b

^a*Institut für Anorganische Chemie der Universität Tübingen D-72076
Tübingen, Germany;* ^b*Fachbereich Chemie der Universität (GH)
Duisburg, D-47048 Duisburg, Germany*

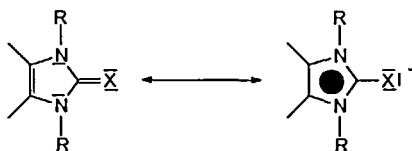
2,3-dihydro-2-selenoimidazoles and their tellurium analogues (**2**) are formed through the reaction of the corresponding 2,3-dihydroimidazol-2-ylidenes (**1**) with the chalcogenes. **2** exhibit nucleophilic properties demonstrated by the formation and properties of their iodine derivatives **3** - **7** and their pentacarbonyl metal complexes **8**.

Key Words: Selenium compounds, tellurium compounds, iodine compounds, imidazoles

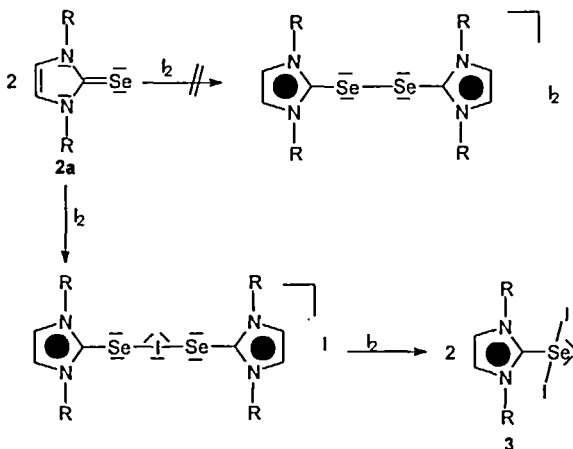
Stable seleno- and tellurocarbonyl compounds **2** are obtained from the reaction of the carbenes **1** with selenium¹ and tellurium,² respectively. The NMR data agree with a bonding situation analogous to phosphane chalcogenides $R_3P=X$ containing a high negative charge density at the chalcogen atom.³ This result is confirmed by a significant lengthening of the CSe and CTe distance. Apart from a tellurocarbonyl osmium complex,⁴ **2b** ($R = {}^iC_3H_7$) is the first structurally characterized compound containing a formal CTe double bond.

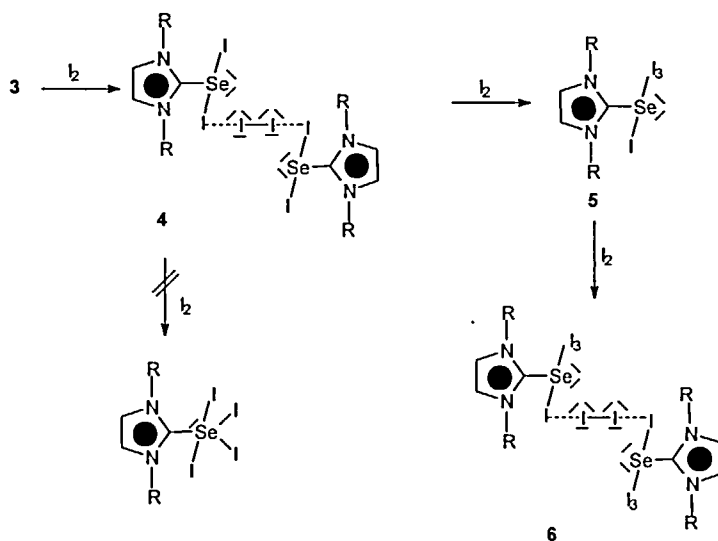


X = Se (a), Te (b) ; R = Me, Et, i-Pr

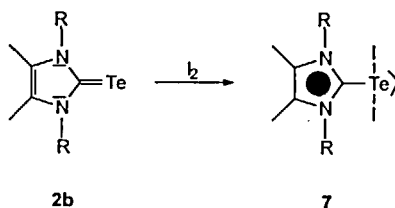


The high negative charge density at the chalcogen atoms makes **2** to be strong nucleophiles which may be compared to the anions RX^- . **2a** is oxidized by iodine in several steps starting from the SeI_2 complex **3**⁵ followed by a sequence of charge transfer adducts and I_3^- salts.⁶

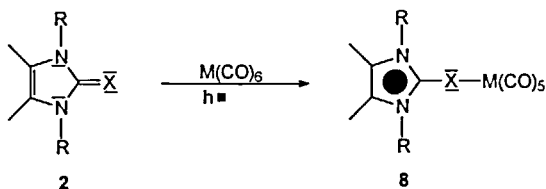




From the reaction of **2b** with iodine, the dimeric TeI_2 complex **7** is obtained exclusively.⁷ On comparison with **3** the structure of **7** reveals the tendency of tellurium to get high coordination numbers.



As expected, the donor properties of the ligands **2** are influenced by their ylidic nature. This result is documented by the spectroscopic data (i.e., ^{13}C n.m.r.) of the pentacarbonyl metal complexes **8**.



The structure of **8** ($X = Se$, $M = Cr$, $R = iC_3H_7$) exhibits the lengthening of the CSe bond upon coordination.⁸

References

1. N. Kuhn, G. Henkel und T. Kratz, *Z. Naturforsch.*, **48b**, 973 (1993).
2. N. Kuhn, G. Henkel und T. Kratz, *Chem. Ber.*, **126**, 2047 (1993).
3. See e.g. N. Kuhn, G. Henkel, H. Schumann und R. Fröhlich, *Z. Naturforsch.*, **45b**, 1010 (1990).
4. G. R. Clark, K. Marsden, C. E. F. Rickard, W. R. Roper, L. J. Wright, *J. Organomet. Chem.*, **338**, 393 (1988).
5. N. Kuhn, G. Henkel und T. Kratz, *Chem. Ber.*, **127**, 1405 (1994).
6. N. Kuhn, R. Fawzi, T. Kratz, M. Steimann und G. Henkel, *Phosphorus, Sulfur and Silicon*, **112**, 225 (1996).
7. N. Kuhn, T. Kratz und G. Henkel, *Z. Naturforsch.*, **51b**, 295 (1996).
8. N. Kuhn, R. Fawzi, T. Kratz, M. Steimann und G. Henkel, *Phosphorus, Sulfur and Silicon*, **108**, 107 (1996).