

This article was downloaded by:

On: 30 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>

The Structure of Adducts of Phosphoryl Compounds with Nitric Acid

E. I. Matrosov^a; M. I. Kabachnik^a; A. N. Nesmeyanov^a

^a Institute of Organo-Element Compounds, USSR Academy of Sciences, Moscow, USSR

To cite this Article Matrosov, E. I. , Kabachnik, M. I. and Nesmeyanov, A. N.(1987) 'The Structure of Adducts of Phosphoryl Compounds with Nitric Acid', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 30: 3, 708

To link to this Article: DOI: 10.1080/03086648708079202

URL: <http://dx.doi.org/10.1080/03086648708079202>

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.

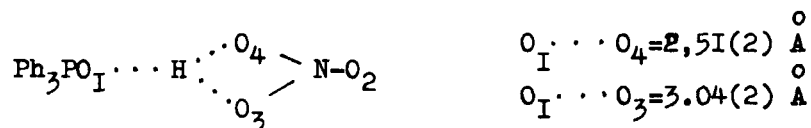
The Structure of Adducts of Phosphoryl Compounds with Nitric Acid

E.I. Matrosov*, M.I. Kabachnik

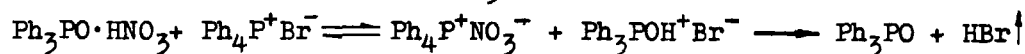
A.N. Nesmeyanov Institute of Organo-Element Compounds, USSR Academy of Sciences, Vavilov Str. 28, Moscow, USSR.

The structure of adducts of phosphoryl compounds with HNO_3 has been studied by means of IR spectra, thermometric titration and X-ray diffraction.

The X-ray analysis has been performed for adduct $\text{Ph}_3\text{PO} \cdot \text{HNO}_3$ (I). The molecular complex with strong H-bond has been found in this crystal. The uncommon case of the bifurcated H-bond is realized in this structure:



The properties of (I) are strongly dependent of the medium. Thus, if (I) is solved in CCl_4 , the \angle_{PO} bond is displaced towards the high frequencies by 100cm^{-1} . It shows that the H-bond becomes essentially weaker. The behaviour of (I) is associated with strong polarizability of the NO_3 fragment bonds. It explains the anion exchange in CHCl_3 :



The stable liquid adducts $(\text{RO})_3\text{PO} \cdot \text{HNO}_3 \cdot \text{H}_2\text{O}$ (II) are formed by the interaction between trialkyl phosphates and nitric acid. The adducts composition do not change by distillation in vacuo. Unlike (I) their IR spectra are slightly changed with their medium. The structure of (II) is under discussion.