

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>

Polarity and Polarisability of 3,3-Dimethyl-1-phosphabutyn

E. A. Ishmaeva^a; I. I. Patsanovsky^b; J. Z. Stepanova^b; G. Becker^b; R. Knebl^b; U. Weeber^b; A. N. Pudovik^b

^a Institut f. Anorganische Chemie, Universität Stuttgart, FRG ^b Kazan State University, Kazan, USSR

To cite this Article Ishmaeva, E. A. , Patsanovsky, I. I. , Stepanova, J. Z. , Becker, G. , Knebl, R. , Weeber, U. and Pudovik, A. N.(1987) 'Polarity and Polarisability of 3,3-Dimethyl-1-phosphabutyn', *Phosphorus, Sulfur, and Silicon and the Related Elements*, 30: 3, 778

To link to this Article: DOI: 10.1080/03086648708079270

URL: <http://dx.doi.org/10.1080/03086648708079270>

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.

Polarity and Polarisability of 3,3-Dimethyl-1-phosphabutynes

E.A.Ishmaeva,^{*} I.I.Patsanovsky, J.Z.Stepanova,

G.Becker, R.Knebl, U.Weeber and A.N.Pudovik

Kazan State University, 420008, Kazan, USSR

Institut f. Anorganische Chemie, Universität Stuttgart, FRG

The progress attained in the field of onecoordinated phosphorus compounds was summarised recently in review (Usp.Chim., 1985, v.54, p.418). Formerly we have been analysed (Izv.Akad.Nauk USSR, Ser.chim., 1984, p.415) the polarity of $P\equiv C$ triple bond in phosphalkynes on the grounds of literary data on dipole moments defined by microwave spectroscopy. In this work the dipole moment of 3,3-dimethyl-1-phosphabutynes (I) was determined in cyclohexane solution: $\mu_{\text{exp.}} = 1,24 \pm 0,05 \text{ D}$, $\alpha = 1,250$, $\gamma = 0,078$, $P_0 = 31,876 \text{ cm}^3$. Analysis of all known up to date experimental data on polarity of phosphalkynes brings us to the conclusion about small polarity of $P\equiv C$ triple bond and slight sensitivity of this value ($0,7 \pm 0,2 \text{ D}$ towards carbon atom) to varying of substituent at C_{sp} -atom. We can only note slight tendency of the increasing $m(P\equiv C)$ in the phosphalkynes $RC\equiv P$ ($R=H, CH_3, F, CH=CH_2, CN, tBu$) with the growth of $-I$ - effect of substituent R.

Onecoordinated phosphorus compounds have not been investigated previously by means of Kerr effect, an anisotropy of polarizability of $P\equiv C$ bond was unknown. We determined experimental molar Kerr constant (I) in cyclohexane solution ($104 \cdot 10^{-12} \text{ e.s.u.}$). Molecular anisotropy of polarizability ($5,30 \text{ \AA}^3$) of (I) is determined mainly by anisotropy of $P\equiv C$ bond ($5,31 \text{ \AA}^3$).