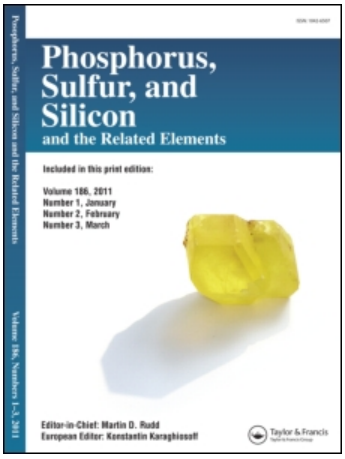


## Phosphorus, Sulfur, and Silicon and the Related Elements

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# Polarity and Polarisability of 3,3-Dimethyl-1-phosphabutyne

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

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# Polarity and Polarisability of 3,3-Dimethyl-1-phosphabutyne

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 summerised 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≡C triple bond in phosphaalkynes on the grounds of literary date on dipole moments defined by microwave spectroscopy. In this work the dipole moment of 3,3-dimethyl-1-phosphabutyne (I) was determined in cyclohexane solution: $\mu_{exp.}$=1,24±0,05D, $\alpha$=1,250, $\gamma$=0,078, $P_o$=31,876 $cm^3$. Analysis of all known up to date experimental date on polarity of phosphaalkynes brings us to the conclusion about small polarity of P≡C triple bond and slight sensitivity of this value (0,7 ±0,2D towards carbon atom) to vareing of substituent at $C_{sp}$-atom. We can only note slight tendency of the increasing m(P≡C) in the phosphaalkynes RC≡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≡C bond was unknown . We determined experimental molar Kerr constant (I) in cyclohexane solution ($104\cdot10^{-12}$e.s.u.). Molecular anisotropy of polarizability (5,30 $A^3$) of (I) is determined mainly by anisotropy of P≡C bond (5,31 $A^3$).