

STRUCTURE OF THE PRODUCTS OF THE REACTION OF TRIALKYLHALOSILANES WITH SODIUM DIETHYL PHOSPHITE

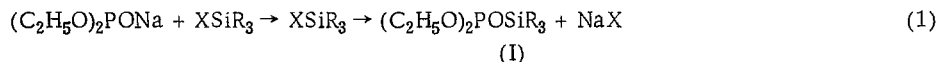
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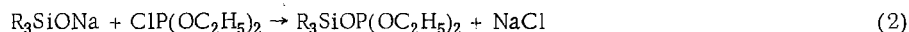
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We have shown that in the reaction of trialkylhalosilanes with sodium diethyl phosphite the products are not quinquivalent phosphorus derivatives containing an Si-P bond, i.e., $(C_2H_5O)_2P(O)SiR_3$, as was supposed earlier [1, 2], but tervalent phosphorus derivatives that are isomeric with these and contain an Si-O-P grouping:



X = Cl, Br; R = alkyl.

The structure (I) was proved by the coincidence of their properties (including the infrared spectra) with the properties of the corresponding compounds prepared in accordance with the equation:



Moreover, the structure (I), representing derivatives of tervalent phosphorus, is confirmed by the ready addition of sulfur and halogens and their ability to undergo the Arbuzov reaction with alkyl halides. The correctness of the above is confirmed by the synthesis in 50-60% yield in accordance with Eqs. (1) and (2) of $(C_2H_5O)_2POSi(CH_3)_3$ (Ia) [b.p. 60-62° (11 mm); n_D^{20} 1.4116; d_4^{20} 0.9485. $C_7H_{19}O_3PSi$. Found: C 40.0, 40.2; H 9.03, 9.21; P + Si 27.7, 27.9%] and of $(C_2H_5O)_2POSi(C_2H_5)_3$ (Ib) [b.p. 105-106° (10 mm); n_D^{20} 1.4332; d_4^{20} 0.9340. $C_{10}H_{25}O_3PSi$. Found: C 48.1, 48.3; H 10.0, 10.1, P + Si 23.4, 23.1%]. With sulfur (Ia) gave $(C_2H_5O)_2P(=S)OSi(CH_3)_3$ in 87% yield; b.p. 56-57° (1.5 mm); n_D^{20} 1.4433; d_4^{20} 1.0261 [the literature [3] gives: b.p. 96-97° (12 mm); n_D^{20} 1.4430; d_4^{20} 1.027 (obtained by another method)]. With sulfur (Ib) gave $(C_2H_5O)_2P(=S)OSi(C_2H_5)_3$ (II) in 91.5% yield; b.p. 89-90° (2 mm); n_D^{20} 1.4540; d_4^{20} 1.0129. $C_{10}H_{25}O_3PSSi$. Found: S 11.9, 11.7%. It is probable that the products of the reaction of trialkoxyhalosilanes with sodium diethyl phosphite also have the structure $(C_2H_5O)_2POSi(OR)_3$, and not $(C_2H_5O)_2P(=O)Si(OR)_3$, as the authors of [4] and [5] supposed. The compounds (Ia), (Ib), and (II) were prepared for the first time.

LITERATURE CITED

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