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Yu. Bosyakov^a; G. Revenko^a; A. Logunov^a; O. Shiganakova^a; N. Kuzmlna^a

^a Institute of Chemical Sciences of the Kazakh Academy of Sciences, Alma-Ata, USSR

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SYNTHESIS AND STEREOCHEMISTRY OF C-FUNCTIONAL DERIVATIVES OF PHOSPHABICYCLODECANE

Yu.BOSYAKOV, G.REVENKO, A.LOGUNOV, O.SHIGANAKOVA,
and N.KUZMINA

Institute of Chemical Sciences of the Kazakh Academy
of Sciences, Krasin Str. 106, Alma-Ata 480100, USSR

Methods for synthesis of new phosphabicyclodecanes with substitution in a heterocycle were worked out. Configurations of individual stereoisomers of $P^{(III)}$ phosphabicyclodecanones, their oxides, sulfides and selenides were established by 1H , ^{13}C , ^{31}P NMR spectroscopy and X-ray analysis. The results show that electron-acceptor groups ($C=O$, $P=X$) enhance mobility of hydrogen atoms in the heterocycle which leads to the increasing ability of phosphabicyclodecanones for deuteration (in α -position to $C=O$, $P=X$), participation in aminomethylation reaction and to the capability to react with electrophiles. The isomerization of 5-oxo- and 5-hydroxyderivatives of $P^{(IV)}$ phosphabicyclodecane in presence of acid and basic catalysts was detected and studied. The mechanism of keto-enolic and thiophosphoryl-merkaptoilide (selenophosphoryl-selenoloilide) ternary prototropic tautomerism is proposed. By varying the temperature and the nature of the solvent and catalyst, it is possible to alter the direction and depth of isomeric transformations. As the result of the studies of stereochemical directivity of reactions of nucleophile addition to double $C=O$ and $C=C$ bonds and of electrophile substitution in phosphabicyclodecanones, the functioning possibilities of such compounds were determined. Polyfunctional derivatives of phosphabicyclodecane, which are of interest for fine organic synthesis of new organophosphorus compounds were obtained.