P-28

NEW FLUORINE-CONTAINING PENTACOORDINATE SILICON COMPOUNDS

M. G. Voronkov, L. I. Gubanova, V. A. Pestunovich and Yu. L. Frolov

Institute of Organic Chemistry, Siberian Division, Ac. Sci. USSR, 1 Favorsky Street,
664033 Irkutsk (U.S.S.R.)

Dimethyl(trifluoroacetoxymethyl)acyloxysilanes, $F_3CCOOCH_2Me_2SiOCOR$ (R = Me, CF_3) with a pentacoordinate Si atom (according to ^{29}Si NMR data) have been synthesized. A new type of pentacoordinate silicon derivatives, organyltetraacyloxysilicates, $M^+[XCH_2Si(OCOF_3)_4]^-$ and dimethyltris(trifluoroacyloxy)silicates, $M^+[Me_2Si(OCOCF_3)_3]^-$ were revealed for the first time by ^{29}Si NMR spectroscopic titration of $XCH_2Me_{3-n}Si(OCOF_3)_n$ (X = H, Cl, Br, I; n = 2, 3) with trifluoroacetic and acetic salts, RCOOM (M = $NH(C_2H_5)_3$, $N(C_2H_5)_4$, Na). The reaction of $XC_6H_4COOCH_2SiMe_{3-n}(OR)_n$ (n = 1-3) with SF_4, HF, BF_3 affords $XC_6H_4COOCH_2SiMe_{3-n}F_n$. These compounds can also be prepared by the reaction of $ClCH_2SiMe_{3-n}F_n$ (n = 1-3) with XC_6H_4K. Judging by X-ray diffraction, the silicon atom in $XC_6H_4COOCH_2SiMe_{3-n}F_n$ (n = 2, 3) is pentacoordinate. The presence of intramolecular coordinate Si←O bond is clearly manifested in the IR and ^{13}C, ^{17}O, ^{19}F and ^{29}Si NMR spectra of these compounds. In non-polar solvents $C_6H_5COOCH_2SiF_3$ forms 1:1 complexes with organic bases such as pyridine, triethylamine, 2,2'-bipyridine, 2-phenanthroline, N,N,N',N'-tetramethylethylenediamine. The reaction of (aroyloxymethyl)trifluorosilanes with KF, CsF and NH_4F gives the corresponding (aroyloxymethyl)tetra- and pentafluorosilicates, $M^+_n[XC_6H_4COOCH_2SiF_{3+n}]^{n-}$ (M = K, CsF, NH_4; n = 1,2). The IR and UV spectra suggest the silicon atom in (aroyloxymethyl)pentafluorosilicates to be heptacoordinate.