

Ligand Redistribution Equilibria in Aqueous Fluoroberyllate Solutions

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The composition of aqueous fluoroberyllate solutions has been studied by ^9Be and ^{19}F NMR spectroscopy for various ratios of the beryllium and fluorine concentrations, and at different pH values. The equilibrium constants have been determined for the ligand exchange processes, which involve the species $[\text{Be}(\text{OH}_2)_4]^{2+}$, $[\text{BeF}(\text{OH}_2)_3]^+$, $[\text{BeF}_2(\text{OH}_2)_2]$, $[\text{BeF}_3(\text{OH}_2)]^-$, and $[\text{BeF}_4]^{2-}$. These equilibria are shifted towards $[\text{BeF}_4]^{2-}$ at high pH. No polynuclear fluoroberyllates have been detected. The fluoride exchange between the individual species is slow on the NMR time scale at room temperature, and separate sharp signals with the expected multiplicity are therefore recorded. Calculated ^9Be chemical shifts are in good agreement with experimental data.

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