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Fluorinated carbonates as new diluents for extraction of f-elements

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Fluorinated diluents have been considered as possible alternative for hydrocarbons. Among their advantages one can list particularly their chemical stability and in many cases high polarity. Unfortunately, the best studied polar fluorinated diluents such as *meta*-nitrobenzotrifluoride (F-3, MNBTF) or phenyl trifluoromethyl sulfone (FS-13, PMTS) have density about 1.41 g/cm^3 and higher solubility in acid solutions than the traditional hydrocarbons. Recently, a new class of fluororganic compounds – carbonates of fluorinated alcohols was proposed as potential diluents. Carbonates of 2,2,3,3-tetrafluoropropan-1-ol (BK-1) and 2,2,3,3,4,4,5,5-octafluoropentan-1-ol are available and rather cheap; they have high boiling point, high density (1.578 and 1.722 g/cm^3 , respectively) and low solubility in water.

In the presented work, extraction ability of two perspective extracting compounds, CyMe₄-BTBP and CyMe₄-BTPPhen, considered for the SANEX process dissolved in the new fluorinated diluent BK-1 was tested to assess the extractability of trivalent lanthanoids and minor actinoids. The dependences of distribution coefficient D_{Am} , D_{Eu} , and D_{Cm} and separation factor $SF_{Am/Eu}$ and $SF_{Am/Cm}$ on HNO₃ concentration (0.001–4 mol/L) were evaluated. The $SF_{Am/Eu}$ values higher than 300 were achieved in 2 mol/L and 4 mol/L HNO₃ for CyMe₄-BTPPhen. The highest $SF_{Am/Cm}$ value (about 5.8) was achieved in 4 mol/L HNO₃ for CyMe₄-BTBP as well. The extraction of studied Ln(III) and An(III) by the neat diluent (without extraction compound) showed that there is no extraction by diluent itself. Moreover, kinetics of Am(III), Eu(III) and Cm(III) extraction was evaluated and will be presented.

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