Octamethyl-octaundecylcyclo[8]pyrrole: a promising sulfate anion extractant.

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Streszczenie

The diprotonated form of an organic-solubilized cyclo[8]pyrrole derivative, bearing eight undecyl chains on the β-pyrrolic positions, was found to extract sulfate anion effectively from neutral aqueous media into a toluene organic phase. The kinetics of sulfate anion exchange between the two phases were found to be exceedingly slow in the absence of the phase-transfer catalyst, Aliquat 336-nitrate (A336N), but appreciable in its presence. The bisnitrate anion bound form of this cyclo[8]pyrrole could be generated in situ by subjecting the toluene phase containing initially 0.5 mM of the sulfate anion bound form and 0.1 mM trioctylamine (TOA) to successive equilibrations with aqueous 0.1 M HNO_3 until sulfate was no longer detected in the aqueous phase. This bisnitrate complex, when studied as a 0.5 mM solution in toluene in the presence of 0.1 mM $(TOAH)^+(NO_3^-)$, was also found to be an effective extractant for sulfate anion. D_{SO4} values of 0.001 and 1000 were observed at 1 M $NaNO_3$(aq) and 0.3 mM $NaNO_3$(aq), respectively, and the logarithm of the conditional exchange constant, log( ), was calculated to be 4.9 ± 0.4. The present cyclo[8]pyrrole system is thus noteworthy as being the first synthetic receptor that displays a high selectivity for sulfate anion in the presence of excess nitrate under conditions of solvent extraction.

Adres publiczny

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