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Actinide stripping by a hydrophilic BTP ligand in aqueous HNO₃ from TODGA-containing organic phase

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N,N,N',N'-tetraoctyl-diglycolamide (TODGA) is broadly studied as a non-specific extractant for actinides and lanthanides from HNO₃ solutions of nuclear waste, in particular for group actinide extraction (GANEX process). Geist and his coworkers proposed a novel hydrophilic ligand, 2,6-bis(5,6-di-(sulfophenyl)-1,2,4-triazin-3-yl)pyridine (SO₃-Ph-BTP) for selective stripping of actinides(III) from the loaded organic phase [A. Geist et al., Solvent Extr. Ion Exch., 30, 433 (2012)], and determined (by TRLFS) the stability constants of its consecutive (from 1:1 to 1:3) complexes with Cm(III) and Eu(III) in aqueous solutions [C.M. Ruff et al., Dalton Trans., 41, 14594 (2012)].

In the present work, we studied the distribution of some actinides(III-VI) in the two-phase systems: TODGA (in kerosene) / SO₃-Ph-BTP (0–100 mM in aqueous HNO₃); and determined the apparent stability constants of their complexes in the aqueous phase, based on the distribution ratios of the metal ions. The effect of protonation of the SO₃-Ph-BTP ligand in the acidic solutions was discussed.

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