Activation of the Aromatic Core of 3,3'-(Pyridine-2,6-diylbis(1*H*-1,2,3-triazole-4,1-diyl))bis(propan-1-ol)—Effects on Extraction Performance, Stability Constants, and Basicity

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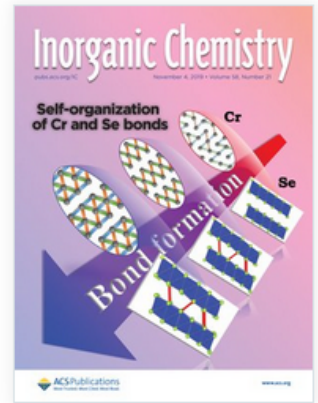

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Abstract

The "CHON" compatible water-soluble ligand 3,3′-(pyridine-2,6-diylbis(1*H*-1,2,3-triazole-4,1-diyl))bis(propan-1-ol) (PTD) has shown promise for selectively stripping actinide ions from an organic phase containing both actinide and lanthanide ions, by preferential complexation of the former. Aiming at improving its complexation properties, PTD-OMe was synthesized, bearing a methoxy group on the central pyridine ring, thus increasing its basicity and hence complexation strength. Unfortunately, solvent extraction experiments in the range of 0.1–1 mol/L nitric acid proved PTD-OMe to be less efficient than PTD. This behavior is explained by its greater pK_a value (pK_a = 2.54) compared to PTD (pK_a = 2.1). This counteracts its improved complexation properties for Cm(III) (log β_3(PTD-OMe) = 10.8 ± 0.4 versus log β_3(PTD) = 9.9 ± 0.5).