Effect of alkyl substituent and spacer length in benzene-centered tripodal diglycolamides on the sequestration of minor actinides

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Electronic Supporting Information

Contents

S1. Purification of ^{241}Am

^{241}Am, which contained ^{237}Np as its daughter product, was purified by first reducing Np to its +4 state using hydroxylamine hydrochloride at 1 M HNO_3 and subsequently extracting the converted Np^{4+} by a 0.5 M TTA (2-thenoyltrifluoroacetaone) solution in xylene (Merck). After two successive extractions of the same aqueous phase (containing ^{241}Am and ^{237}Np) with fresh TTA solutions taken each time, the aqueous phase was shaken with two lots of xylene (to extract the dissolved TTA in the aqueous phase) and subsequently evaporated to dryness; a few drops of a mixture of concentrated HNO_3 and $HClO_4$ (5:1 ratio) were added to destroy the organic impurities, if any. Alpha spectrometry of the purified ^{241}Am stock was carried out to rule out the presence of impurities.

S2. Radiometric assay of ^{241}Am and ^{152,154}Eu

^{241}Am and ^{152,154}Eu were assayed radiometrically using a well type NaI(Tl) scintillation counter (Para Electronics) which was interphased with a multi-channel analyzer (ECIL, India). For experiments where the extraction of Am or Eu were very large or very low, the aliquot size from the phase containing low counts was kept large enough to have more counts. Additionally, the counting time was increased (in some cases >10 h counting time was used as against only one minute for most samples). The counter was calibrated with known standards before the counting was done. Enough counts were collected (>10,000 counts) to neglect the counting statistics errors (<1%).

S3. Solvent extraction studies

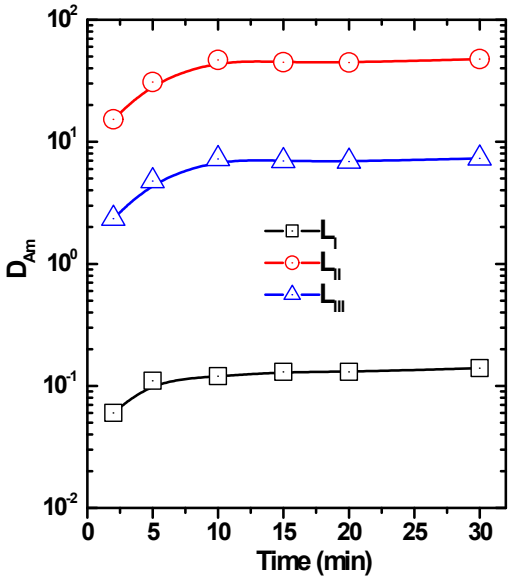

Fig. S1 Distribution ratio of Am(III) as a function of time to establish the equilibration time. Organic phase: 1 mmol/L ligand in 5% iso-decanol / *n*-dodecane; Aqueous phase: 3 M HNO_3; Temperature: 25 °C.

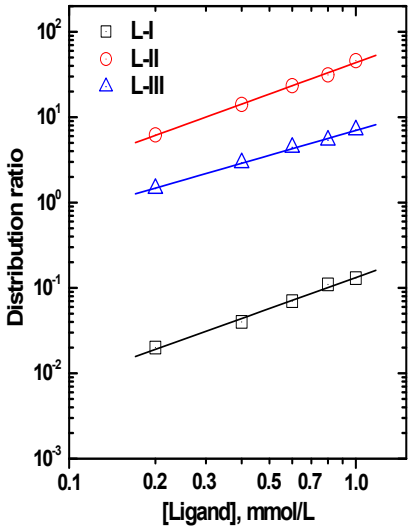

Fig. S2 Effect of ligand concentration on the extraction of Am(III). Aqueous phase: 3 M HNO_3; Temperature: 25 °C.