Electronic Supporting information

Benzene-centred Tripodal Diglycolamides for Sequestration of Trivalent Actinides: Metal ion Extraction and Luminescence Spectroscopic Investigations in Room Temperature Ionic Liquid

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S1. Purification of ^{241}Am

^{241}Am was purified from its daughter product, ^{237}Np, by first reducing Np to its +4 state using hydroxylamine hydrochloride at 1 M HNO_3 and subsequently extracting Np^{4+} by TTA (similar to the extraction of Pu^{4+} mentioned above). The aqueous phase was evaporated to dryness and a few drops of mixture of concentrated HNO_3 and $HClO_4$ (5:1 ratio) was added to destroy the organic impurities. Alpha spectrometry of the purified ^{241}Am stock was carried out to rule out the presence of the 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 which was interphased with a multi-channel analyzer. 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, counting time was increased (some cases, >10 h counting time was used as against only one minute of counting time used 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

The time required to attain equilibrium was investigated using all the three Bz-T-DGA ligands in $[C_4mim][Tf_2N]$.

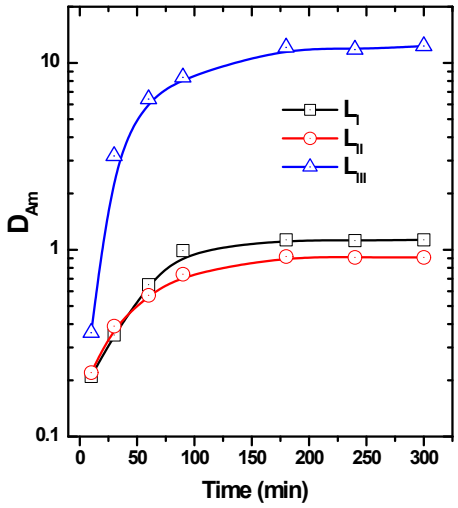

Figure S1. Extraction kinetics of Am^{3+} by benzo-T-DGA ligands. [Ligand]: 0.5 mmol/L in $[C_4mim][Tf_2N]$. Aqueous phase: 3 M HNO_3

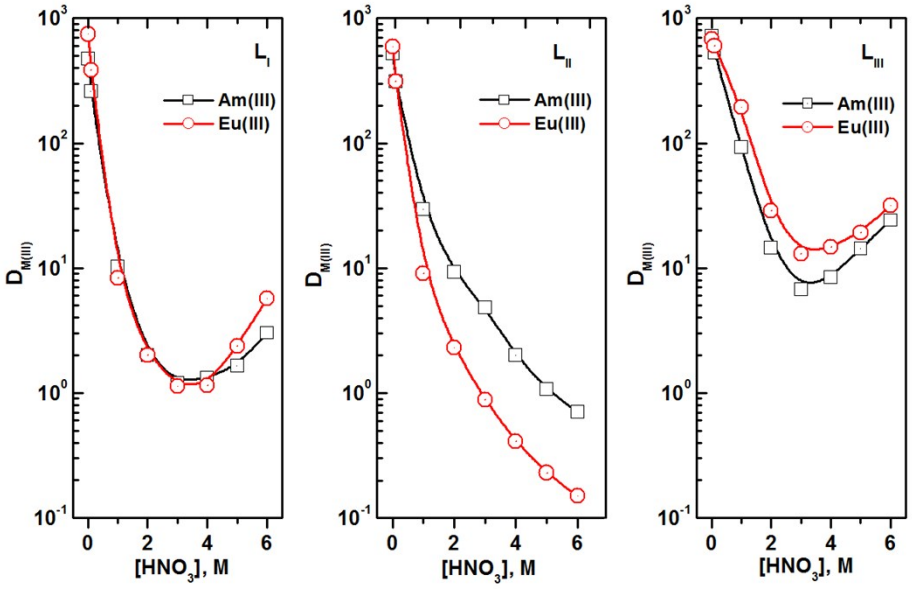

Fig. S2 Y-axis normalized acid concentration dependent extraction of Am^{3+} and Eu^{3+} by the benzene centred tripodals. [Ligand]: 0.5 mmol/L in $[C_4mim][Tf_2N]$.

S4. Luminescence studies

Luminescence spectra of extracts obtained from D_2O and H_2O are given below.

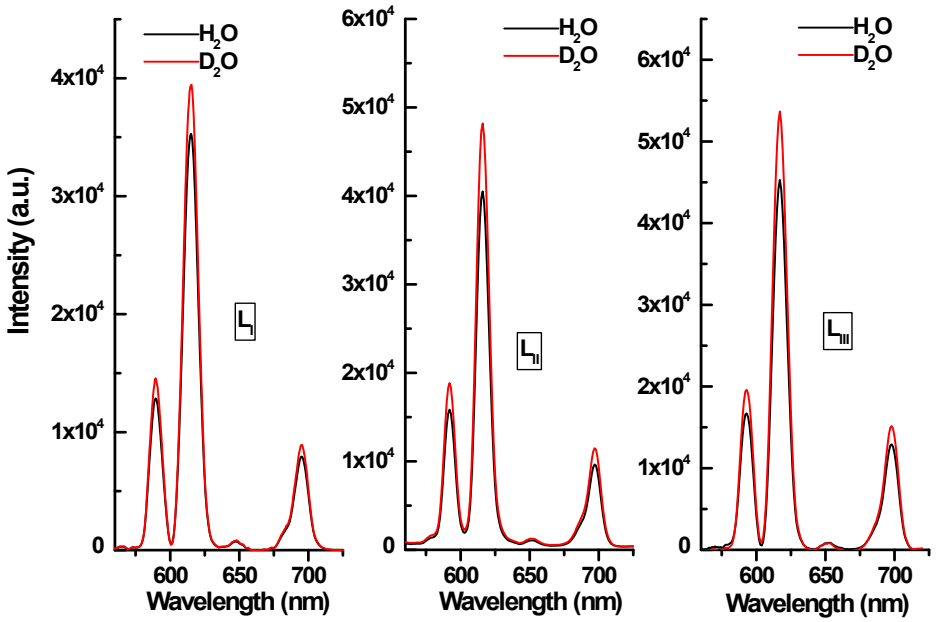

Figure S3. Luminescence spectra of Eu^{3+} extracts obtained in the three ligands in $[C_4mim][Tf_2N]$ ([ligand] = 1 mM). Eu^{3+} concentration: 2 mM in 0.01 M HNO_3 / DNO_3. Excitation: 394 nm

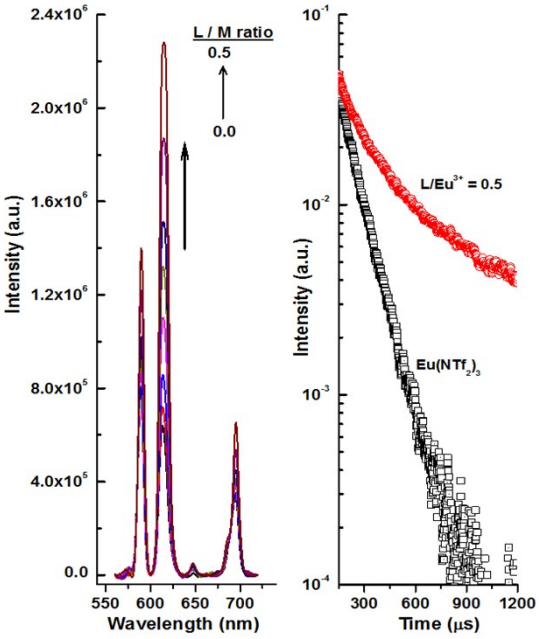

Figure S4. Luminescence spectra of Eu^{3+} in $[C_4mim][Tf_2N]$ with increasing ligand concentration (Left), and fluorescence decay curve (Right). Cuvette: 7.99 micromole Eu^{3+} (1.6 mL); Titrant: 2 mmol/L $\mathbf{L_{III}}$ / $[C_4mim][Tf_2N]$; Excitation: 394 nm; Emission: 615 nm.