538c Redox-Active Ligands Designed to Promote Am Separation from CM and Lanthanide Fission Products in Spent Nuclear Fuel

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This project employs a modification of the covalent p-acceptor strategy, using *non-innocent* redox-active *o*-catecholate ligands (and related 1,2-disubstituted N- and S-containing derivatives) to take advantage of the capacity for Am to access higher oxidation states, which offers an attractive option to separate a chemically distinct Am^{4+} species from Cm^{3+} and the trivalent lanthanides. U(III) and Ce(III) complexes are used as homologues for Am(III) and Eu(III). The electronic factors that govern the role of the valence orbitals in covalent bonding and redox reactivity are a major focus of this project, as are the kinetic and thermodynamic processes occurring in solution. Ligand systems showing promising contrasts between U and Ce will be modified for extraction experiments with radiotracer ^{152}Eu under conditions that mimic those to be used on spent fuel samples.