

## **Fundamental Studies Regarding Synergism Between a Calix[4]arene Biscrown-6 Ether and Selected Modifiers in the Solvent Extraction of Cesium**

Lætitia H. Delmau, Thomas J. Lefranc, Peter V. Bonnesen, Gary J. Van Berkel and Bruce A. Moyer

Calix[4]arene biscrown-6 ethers, molecules already well known for their exceptional abilities to extract selectively cesium over other alkali metals, exhibit significantly enhanced cesium extraction strength by the addition of solvating components referred to as modifiers to the solvent. The manner in which modifiers enhance cesium extraction is believed to predominantly involve anion solvation. This hypothesis has recently been reinforced following anion-mode electrospray mass spectrometry experiments, which show that the modifiers are associated as 1:1 complexes with various anions. In an effort to further probe the manner in which the modifier acts cooperatively with the calixarene crown ether, the extraction of cesium was investigated for selected modifiers at various concentrations in dodecane diluent from simple aqueous mixtures containing only cesium nitrate in sodium or potassium nitrate. An interpretation of the results of these experiments was obtained through slope analysis and through equilibrium modeling.