

## **An Unexpected Route to the Formation of Covalent Bonds in Cerium and Berkelium Coordination Complexes**

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This talk will focus on the unexpected observation of a “plane of covalency” that apparently exists in a family of lanthanide and actinide coordination complexes that possess an unusually polarized ligand. The atypical bonding exhibited by these complexes alters the nature of the ground states of the metal ions from what would typically be observed as evidenced from EPR spectra, magnetic susceptibility measurements, and evaluation of bond distances obtained from low-temperature crystal structures. Theoretical predictions led to the supposition that these effects would be enhanced by extrapolating from Ce<sup>III</sup> to Bk<sup>III</sup> with the latter being the closest electrochemical analog of cerium in the actinide series. The berkelium complex was prepared with great difficulty and the theoretical predictions were validated in regard to both expected bond metrics and electrochemical behavior.