



Glenn T. Seaborg Center Seminar

GAS-PHASE STUDIES OF THE F-BLOCK ELEMENTS INORGANIC CHEMISTRY WITHOUT SOLVENT OR LATTICE

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4:00 - 5:00 pm

Building 70A, Room 3377

In gas-phase metal ion-chemistry studies, the physical and chemical properties of ionic species are inspected in the absence of perturbing factors that occur in condensed phases, solution or solid, where the dense environments formed by the solvent or lattice have significant contributions. At this fundamental level, the reactivity and bonding of the metal ions generally correlate directly with their electronic structures and energetics. These studies typically rely on the use of different mass-spectrometry techniques.

The f-block elements have unique electronic structures and chemical properties. The lanthanides generally exhibit similar condensed-phase chemistry but reveal large variations in gas-phase behavior. The actinides have a more varied condensed-phase chemistry and also show a diverse behavior in the gas phase. Throughout the past 15 years, we have used FTICR mass spectrometry to examine the gas-phase ion chemistry of these elements, the lanthanides from La to Lu except Pm and the actinides from Th to Cm. We have revealed the existence of new species, determined thermodynamic properties of neutral and ionic molecules, and in the case of the actinides probed the role played by the 5f electrons. In this presentation, we will make a brief journey through several examples from these studies, with which we expect to have contributed to an improved knowledge of the chemistry of the f-block elements.

