Plenary and Session Lectures

D1

Recent Developments in the Chemistry of Element 96, Curium

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The preparation and properties of the following curium compounds will be reported: CmSi, Cm_2Si_3, $CmSi_2$, $CmPO_4 \cdot xH_2O$, $Cm(ReO_4)_3 \cdot xH_2O$, $Cm(ReO_4)_3$, $Cm_2(WO_4)_3$, $CmVO_4$, $CmCrO_4$, $CmAsO_4$, $CmScO_3$, $CmVO_3$, $CmCrO_3$, $CmFeO_3$, $Cm_2(C_2O_4)_3 \cdot xH_2O$, $Cm(HCOO)_3$. The special microchemical preparation techniques used in this work will be described in detail; lattice constants and other X-ray data will be reported.

D2

Lanthanide and Actinide Oxidation States in Complex Oxides and Halides*

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Complex oxides and halides of the lanthanides and actinides have been studied extensively and reviewed thoroughly. Trivalent lanthanides and tetravalent actinides are readily prepared as complex halides; these two classes of complex compounds have been thoroughly investigated. Among complex oxides the most important groups have been those of the trivalent lanthanides and the hexavalent actinides.

A number of recent research programs have been carried out on classes of complex compounds of unusual oxidation states. For example, exotic oxidation states such as Ln(II) and An(V) have been the focus of study of $CsLnX_3$ and $MAnO_3$ compounds (M = Li–Cs). In this category should also be placed the complex tetravalent oxides $BaLnO_3$ and $BaAnO_3$, since these compounds are relatively unstable (for different reasons).

This paper identifies some of the highlights of recent reviews cited above, and compares and contrasts the structural and thermodynamic properties of these important classes of compounds. 'Mixed oxides', such as $LnLn'O_3$ and $An_xAn'_{1-x}O_2$, are not treated here. Important predictions and areas for new research opportunities are identified.

D3

Crystal Field and Exchange Interactions in the Cubic Uranium Semimetallic Compounds

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(To be published later as a full paper)

D4

A Comparison of the Structural Parameters of Organolanthanide and -Actinide Complexes with those of Transition Metals in Similar Environments

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The organometallic chemistry of the lanthanides and actinides has undergone a vast expansion in the past few years. New types of structure and reactivity found today were unforeseen only a few years ago. A comparison of the chemistry of lanthanides and actinides to that of transition metals previously would have been rather insignificant, but now is of growing importance. This discussion will center on structural data and where possible its relevance to reactivity.

Our group interest in this topic arose from two different types of comparisons. First, the X-ray structural investigations of MCp_4 (M = Ti, Zr, Hf, U) provided interesting results. For M = Ti, *1* was found, while *2* pertained for M = Zr. Even though Hf and Zr differ by only 0.01 Å in ionic or metallic radii, M = Hf produced structural type *1*, not *2*. For the larger M = U, *3* was found by Burns. The 4+ ionic radii for

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