[ABSTRACT]

New Insights into the Behavior of f Element Metals and Compounds under Pressure

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Several advancements over the past decades in performing studies of f elements under pressure have improved significantly the quality of experimental data obtained. A central issue in such studies is to examine how the decreasing interatomic distances brought about by pressure affect the electronic energy levels and bonding in the materials. An especially interesting aspect is whether pressure can force the involvement of normally localized f electrons into the bonding. One experimental approach is to monitor the structural forms of materials under pressure and then interpret the findings in terms of theoretically and/or experimentally established structure-bonding patterns. Recent findings for selected f elements and their compounds will be presented and discussed in terms of our present understanding of different processes. [Research sponsored by the Division of Chemical Sciences, Geosciences and Biosciences, OBES, USDOE under contract DE-AC05-00OR22725 with ORNL, managed by UT-Battelle, LLC].