Since actinide compounds and particularly the oxides have low sputtering yields, deposits in the 10–100 μg cm^{-2} thickness range require deposition times ranging from several minutes to a few hours. The glove box adaptation is made by disconnecting the control unit from the deposition chamber and the pumping unit. The glove box is divided in two compartments: one containing the deposition chamber and the other the pumping group. When metallic samples are handled, the glove box is flushed with pure argon or nitrogen.

Deposits of the following isotopes have been prepared: ^{230,232}Th, ^{231}Pa, ^{233,235,238}U, ^{237}Np, ^{239,241}Pu, ^{241,243}Am, ^{244}Cm as oxides and ^{232}Th, ^{235}U, ^{238}U, ^{239}Pu, ^{241}Am as metals.

Generally actinide thin film deposition starting from metals leads to oxide deposits. The realization of metallic layers requires special care towards the glove box atmosphere purity, particularly in the case of Pu and trans Pu isotopes.

The characterization of the oxidation state can be achieved using ESCA and the deposition rate is monitored either by integrating the ionic current or by a quartz oscillating monitor.

Electrospraying and focused ion beam appear as complementary techniques for thin film depositions of actinide compounds and particularly the scarce isotopes when classical methods such as vacuum evaporation or electrodeposition are ineffective.

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Oxysulfide Glasses in the La_2S_3–La_2O_3–Ga_2S_3–Ga_2O_3 System

M. GUITTARD, A. M. LOIREAU-LOZAC'H, F. BERGUER and J. FLAHAUT*

Laboratoire de Chimie Minérale Structurale associé au CNRS, Faculté de Pharmacie, 4, avenue de l'Observatoire, F-75270 Paris Cédex 06, France

Glasses were previously described in the La_2S_3–Ga_2S_3 and La_2O_2S–Ga_2S_3 systems. Actually, a very large glass former region exists in the La–Ga oxydesulfide system, in the neighbouring of Ga_2S_3 (which alone does not form glass by quenching). In order to explain the formation of glasses, a tentative phase diagram is proposed from DTA and X-rays diffraction studies. A large concentration of ternary invariants is present in the glass former region. Some new quaternary compounds have been identified, and their structures were solved. The $La_{10/3}Ga_6S_{12}O_2$ compound is only formed from glasses by convenient heat-treatment. Its structure is supposed to be closely related to the structure of the glasses. Glasses are generally obtained by quenching the melt products at 1100–1200 °C. Along two eutectic valleys, glasses can be obtained after slow cooling. The thermal properties of the glasses (T_g, T_c, T_m) are described. Glasses have yellow brown colour. They are transparent in large regions of the visible and I.R. spectra.

Some informations have been obtained with Nd-doped glasses: a large nephelauxetic effect is observed in the absorption spectra, in relation with strong covalent character of the rare earth–non metal bonds. Moreover the Raman spectra of the glasses are not exactly the envelope of the Raman spectra of the crystalline products: the stronger Raman band at 230 cm^{-1} which is characteristic of a stretching mode of Ga–S_4 tetrahedra is not observed with the glasses.

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Magnetic Properties of Es_2O_3 and EsF_3

PAUL G. HURAY*, S. E. NAVE, R. G. HAIRE and J. R. MOORE

Physics Department, The University of Tennessee, Knoxville, Tenn. 37996-1320, U.S.A., and Transuranium Research Laboratory, Chemistry Division, Oak Ridge National Laboratory, Oak Ridge, Tenn. 37830, U.S.A.

The first quantitative measurements of the magnetic properties of einsteinium have been made on Es_2O_3 and EsF_3. The data were collected at temperature between 4.2 and 180 K while maintaining the samples in various applied magnetic fields. The paramagnetic moment per einsteinium atom was 10.4 ± 0.3 μ_B for the Es_2O_3 sample and 11.4 ± 0.3 μ_B for the EsF_3 sample. These values may be compared to a theoretical value of 10.6 μ_B for a $5f^{10}(Es^{3+})$ free ion calculated by using Hund's Rule and L–S coupling.

Sample Preparation. The einsteinium used in the study was purified by ion exchange chromograph techniques and 30 μg of a ^{253}Es–^{254}Es isotope mixture were obtained as a chloride solution. A micro-precipitation technique using teflon molds [1] was employed to precipitate the einsteinium as an oxalate, and this material was then calcined up to 1000 °C in air to form an off-white, Es_2O_3 product. A similar approach was used to prepare EsF_3. Electrolytic grade HF was added to the purified chloride solution of trivalent einsteinium to produce a micro-precipitate. The resulting washed precipitate