

ON THE SYNTHESIS OF NEW XENON(VI) FLUOROMETALATES OF GROUP III-A ELEMENTS AND LANTHANIDES

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Hydrazinium and ammonium fluorometalates proved in the past to be very effective starting materials for the syntheses of new xenon(VI) fluoro compounds. Using this synthetic route a series of xenon(VI) fluoro complexes has been isolated: $\text{XeF}_6 \cdot \text{FeF}_3$, $\text{XeF}_6 \cdot \text{GaF}_3$, $\text{XeF}_6 \cdot 2\text{AlF}_3$, $\text{XeF}_6 \cdot \text{ZrF}_4$ and $\text{XeF}_6 \cdot \text{HfF}_4$ (J. Slivnik, B. Žemva, M. Bohinc, D. Hanžel, J. Grannec, P. Hagenmuller, J. Inorg. Nucl. Chem., 38 (1976) 997; B. Žemva, S. Miličev and J. Slivnik, J. Fluorine Chem., 11 (1978) 519; Ibid., 11 (1978) 545). Recently, these investigations were extended to reactions between xenon hexafluoride and hydrazinium fluorometalates or oxides of scandium, yttrium, lanthanum and some lanthanides. During this study a whole series of new xenon(VI) fluorometalates was isolated and characterized. The elements with trifluorides which crystallize in a YF_3 type of structure form 3:1 compounds which are stable at room temperature and represent the first examples of the $(\text{XeF}_5^+)_3\text{MF}_6^{3-}$ type of xenon(VI) fluorometalate (e.g. $3\text{XeF}_6 \cdot \text{YF}_3$, $3\text{XeF}_6 \cdot \text{DyF}_3$). The elements with trifluorides which crystallize in a LaF_3 type of structure form new xenon(VI) fluorometalates only if they could be oxidized to the 4+ valence state (e.g. $4\text{XeF}_6 \cdot \text{MF}_4$, $\text{XeF}_6 \cdot 2\text{MF}_4$ and $\text{XeF}_6 \cdot 4\text{MF}_4$ with M being Ce, Pr, Tb).