

AURUM (V) FLUORIDES REACTIONS WITH WATER AND THEIR THERMOCHEMISTRY.

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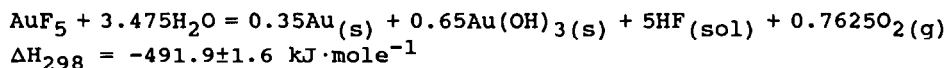
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The enthalpies of reactions in water of solid $\text{Ba}(\text{AuF}_6)_2 \cdot 4\text{KrF}_2$ and $\text{Ba}(\text{AuF}_6)_2$ were measured at 298.2 K using an air tight liquid isothermal calorimeter. These enthalpies were used to obtain an alternate set of formation standard enthalpies for these compounds.

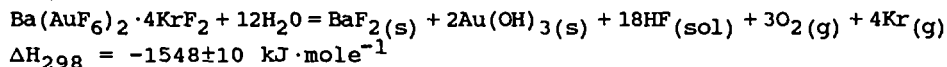
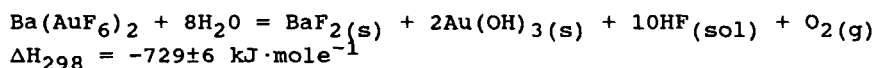
The analogous to these measurings for AuF_5 and MAuF_6 ($M=\text{Na}, \text{K}, \text{Rb}$) and also AuF_3 were conducted earlier. Recommended values for ΔH°_{f298} mentioned solid fluorides are: $\text{AuF}_5 = -413.2 \pm 5$; $\text{NaAuF}_6 = -1094.5 \pm 6.5$; $\text{KAuF}_6 = -1158.8 \pm 6.5$; $\text{RbAuF}_6 = -1145.2 \pm 6.5$; $\text{AuF}_3 = -473.4 \pm 5 \text{ kJ} \cdot \text{mole}^{-1}$. For $\Delta H^\circ_{f298} \text{ Au}(\text{OH})_3$ was decided the value $-433 \pm 6.5 \text{ kJ} \cdot \text{mole}^{-1}$.

All compounds were prepared by fluorination of gold in KrF_2 in solutions in HF (Kel-F reactor). $\text{Ba}(\text{AuF}_6)_2 \cdot 4\text{KrF}_2$ was prepared in conditions of a large excess of KrF_2 .

It is interesting to note that the reaction AuF_5 in water and aqueous sodium hydroxide (0.05 N) went to precipitation of metallic gold, for example:



The separate measurements gave values of -2442 ± 15 and $-3132 \pm 15 \text{ kJ} \cdot \text{mole}^{-1}$ for $\Delta H^\circ_{f298} \text{ Ba}(\text{AuF}_6)_2$ and $\text{Ba}(\text{AuF}_6)_2 \cdot \text{KrF}_2$ respectively, yielding.



The reaction enthalpy of the process $\text{AuF}_3(s) + \text{F}_2(g) = \text{AuF}_5(s)$ was estimated. AuF_5 was synthesised by this reaction.