I-57

HYDROTHERMAL SYNTHESIS OF FLUORATED SINGLE CRYSTALS: $BaMnF_4$ and $BaF_2 \cdot HF$

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Investigations to eliminate defects in the incommensurate phase $BaMnF_4$, led to a method of preparation at a temperature lower than the melting point of $BaMnF_4$. Qualitative studies of the systems $BaF_2 - H_2O - HF$ and $MnF_2 - H_2O - HF$ showed that very pure single crystals of $BaMnF_4$ could be grown at a temperature lower than 300°C. Several new phases could be isolated as single crystals, in particular :

BaF_2,HF

Single crystal X-ray analysis revealed the compound to be monoclinic (Space Group $P2_1$ and Z = 2) and confirmed the formula found by chemical analysis. However, because of the difficulty to distinguish between fluorine and oxygen atoms, some problems remain, which will be solved by neutron diffraction studies. Infrared analysis indicate the presence of HF_2^- and suggest the following representation :

$(Ba^{2+})_2(HF_2^-)_2(F^-)_2$.

It is possible to extend this method of synthesis to the preparation of other fluorides and related compounds, in particular to those of europium and strontium.

I-58

TRANSITION METAL DERIVATIVES WITH THE $OTeF_5$ GROUP

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$-OTeF_5$ Derivatives are presented of Ti, V, Nb, Ta, Cr, Mo, W, Re, Os and Au. The coordination behaviour of these central atoms are discussed. Ti, V, and Cr prefer tetrahedral environment, Mo, Os, and Re prefer a pentacoordinated species, while W (as the long-known U-derivatives) prefers the octahedral environment. Some crystal structures are presented.