

microscopy have been applied to this system. At least for the experimental conditions employed, the structure of the congruently melting $4\text{Nb}_2\text{O}_5 \cdot 9\text{WO}_3$, with 4/12 of pentagonal tunnels occupied, dominates the stability field. However, structures with 6/16 sites in a 2×2 TTB superlattice, and with 7/20 sites in a 5×1 TTB superlattice occupied form quite extended domains in a $4\text{Nb}_2\text{O}_5 \cdot 9\text{WO}_3$ matrix. In addition, the structure with 5/16 sites in a 2×2 TTB superlattice forms domains in preparations richer in WO_3 than $4\text{Nb}_2\text{O}_5 \cdot 9\text{WO}_3$, and this $2\text{Nb}_2\text{O}_5 \cdot 5\text{WO}_3$ structure itself shows evidence of ordered intergrowth with the $2\text{Nb}_2\text{O}_5 \cdot 7\text{WO}_3$ characterised electron microscopically by Iijima. The status of these ordered domain structures is discussed. Metastable structures may be effectively stabilised by coherent intergrowth with structures that are absolutely stable.

Nucleation Mechanism during Low Temperature Decomposition of Ammonium Perchlorate. E. F. KHAIRETDINOV, T. V. MULINA, AND V. V. BOLDYREV. Institute of Chemical Kinetics and Combustion, Siberian Branch of the Academy of Sciences of the U.S.S.R., Novosibirsk, 90. It is shown that proton-acceptor additions are effective inhibitors of the nucleation process of low-temperature decomposition of ammonium perchlorate (AP). In contrast to this, addition of ClO_3^- ion is a catalyst for the decomposition of AP: it increases the rate of nucleation V_n and the maximum concentration of nuclei N_{max} and decreases the induction period of nucleation τ . It is shown that addition of ClO_3^- ion is present in the purest commercial samples of AP. It is thought that the initiator of nucleation is HClO_3 , i.e., $V_n = [\text{H}^+] \times [\text{ClO}_3^-]$. The dependence which is demonstrated agrees very well with experimental data on the influence of addition of proton donors and acceptors and also of additions of ClO_3^- ions on V_n . On the basis of this mechanism, means of regulating the temperature of initiation of AP decomposition are suggested. An explanation of the photosensitivity of AP exposed to the uv band is proposed.

On the Problem of Polymorphism and Fusion of Lanthanide Trifluorides. I. The Influence of Oxygen on Phase Transition Temperature. B. P. SOBOLEV, P. P. FEDOROV, AND D. B. SHTEYNBERG. Institute of Crystallography of the Academy of Sciences of the USSR, Lenisky pr. 59, Moscow B-117333, U.S.S.R. AND B. V. SINITSYN AND G. S. SHAKHKALAMIAN, State Institute of the Rare-Metal Industry, Moscow, U.S.S.R. The details of using thermal analysis (TA) in the investigation of lanthanide trifluorides are examined. By examining the literature on the problem of phase transitions in LnF_3 ($\text{Ln} = \text{lanthanum}$ and the lanthanides) it is established that the basic reason for disagreement among the data of various authors is in most cases lack of control of pyrohydrolysis of LnF_3 . For the first time the TA method is used to study parts of the state diagrams of the $\text{LnF}_3\text{-Ln}_2\text{O}_3$ systems ($\text{Ln} = \text{Gd, Tb, Ho, Er, and Y}$). Phases $\text{LnF}_{3-2x}\text{O}_x$ were $0 \leq x \leq 0.2$, which were not known earlier, are discovered. According to the type of interaction of LnF_3 with the corresponding Ln_2O_3 , the trifluoride series is broken down into several groups corresponding to the structural type in which the LnF_3 crystallizes. The portions of the state diagrams of the $\text{LnF}_3\text{-Ln}_2\text{O}_3$ systems that were studied permit us to explain the reasons for contradictions in existing data on the temperatures of phase transformations in LnF_3 .

On the Problem of Polymorphism and Fusion of Lanthanide Trifluorides. II. Interaction of LnF_3 with MF_2 ($M = \text{Ca, Sr, Ba}$), Change in Structural Type in the LnF_3 Series, and Thermal Characteristics. B. P. SOBOLEV, P. P. FEDOROV, AND N. L. TKACHENKO. Institute of Crystallography of the Academy of Sciences of the USSR, Lenisky pr. 59, Moscow B-117333, U.S.S.R. and K. B. SEIRANIAN, Erevan State University, Erevan, U.S.S.R. The results are presented of a study of the interaction of LnF_3 with MF_2 ($M = \text{Ca, Sr, Ba}$) for 34 binary systems of the $\text{LnF}_3\text{-MF}_2$ type in concentration range 60–100 mol % of LnF_3 . It is shown that in this range the type of interaction of the components in the $\text{LnF}_3\text{-MF}_2$ systems is similar to that in the $\text{LnF}_3\text{-Ln}_2\text{O}_3$ systems. There is discussed the problem of stabilizing different structural types of LnF_3 (tysonite and $\alpha\text{-YF}_3$) during the isomorphous replacement of Ln^{3+} by M^{2+} and 2F^{-1} by O^{2-} with formation of solid solutions $\text{Ln}_{1-x}\text{M}_x\text{F}_{3-x}$ and $\text{LnF}_{3-2x}\text{O}_x$, respectively. In the case of congruent fusion of these phases, the coordinates of the maximum on the fusibility curve (according to composition) are regularly displaced to the side of pure LnF_3 with a decrease in the atomic number of the lanthanide. The vacancy stabilized phases are typical examples of variable composition compounds (berthollides). On the basis of data on the interaction of components in the $\text{LnF}_3\text{-Ln}_2\text{O}_3$ and $\text{LnF}_3\text{-MF}_2$ systems, problems of polymorphism and changes of structural type in the LnF_3 series are discussed. Fusion and polymorphic transformation temperatures are given for LnF_3 with control of oxygen content in the specimens after thermal analysis.