

Thermal behaviour of the systems ZnO – MgO – NH₄PO₃ and ZnO – CaO – NH₄PO₃

G. L. Krul, A. I. Lesnikovich, A. F. Selevich

Research Institute for Physical Chemical Problems, Belarusian State University, Minsk, Belarus,
e-mail: selevich@bsu.by

It was found earlier that large majority of the double systems M^{II}O–NH₄PO₃ (M^{II} = Mg, Ca, Mn, Co, Ni, Cu, Zn, Cd, and Pb) demonstrated similar schemes of crystalline phase transformations. In particular, an increase in temperature from 300 to 400 °C and in reaction time causes the consecutive crystallization of the following compounds: M(NH₄)₂(PO)₄ or M(NH₄)₂P₄O₁₂, MNH₄(PO₃)₃ or MNH₄P₃O₉, M(PO₃)₂ or M₂P₄O₁₂ [1]. It was shown also that double ammonium-containing condensed phosphates are the promising flame retardant additives to polyamides [2]. The aim of this work was to study an opportunity to obtain ternary ammonium-containing condensed phosphates in the systems ZnO–MgO–NH₄PO₃ and ZnO–CaO–NH₄PO₃. Reactions of metal oxides initial mixtures (molar ratio ZnO : Mg(Ca)O = 1 : 3 and 3 : 1) with NH₄PO₃ at the molar ratio MO : NH₄PO₃ = 1 : 6 were investigated at the temperatures 300 and 400 °C. As a result, conditions for obtaining ammonium-containing condensed phosphates based on structural types of CaNH₄P₃O₉, ZnNH₄(PO₃)₃, MgNH₄(PO₃)₃ and MgNH₄P₃O₉ have been determined.

References

1. A. F. Selevich, E. V. Grushevich, L. S. Ivashkevich, et al. *Phosphorus Res. Bull.* **19** (2005) 228.
2. G. F. Levchik, S. V. Levchik, A. F. Selevich, et al. *Fire Retardancy of Polymers. The Use of Intumescence.* (1998) 280.