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THERMAL TRANSFORMATIONS OF ZINC-CADMIUM AQUAAMINODIPHOSPHATE

V. A. Kopilevych, D. A. Savchenko, R. S. Boiko

National University of Life and Environmental Sciences of Ukraine

M. S. Slobodianyk

Taras Shevchenko National University of Kyiv

Progress in the development of modern technology and chemical technology stimulates the growth of the importance of inorganic phosphate materials; it significantly expands the area of use of condensed phosphates of transition metals due to their valuable and sometimes unique physico-chemical and technical properties.

The aim of this work was to study thermal transformations of the X-ray and crystalline zinc-cadmium aquaaminodiphosphates of total composition: $Zn_xCd_{2-x}(P_2O_7)_{1,0}\cdot n(NH_3)\cdot m(H_2O)$.

Experimental studies were conducted using differential thermal analysis of the synthesized products on derivatograph Q - 1500 D in mode of dynamic heating (air atmosphere in platinum conical crucibles with lid). To identify the composition of synthesized aquaaminophosphates and products of their thermolysis, they were used infrared spectroscopy (spectrophotometer Specord - 75IR), qualitative and quantitative paper chromatography, X-ray analysis (diffractometer DRON-UM1, monochromatic CuK_α-radiation).

They were identified and established patterns of thermal transformations of synthesized compounds $Zn_{1,5}Cd_{0,5}P_2O_7\cdot 2,5NH_3\cdot 2,2H_2O$, $Zn_{0,5}Cd_{1,5}P_2O_7\cdot 1,8NH_3\cdot 2,5H_2O$ and $Zn_{1,0}Cd_{1,0}P_2O_7\cdot 2,1NH_3\cdot 1,9H_2O$, the latter of which has a crystal structure of rhombic system.

It was established that thermolysis of $Zn_{1,0}Cd_{1,0}P_2O_7\cdot 2,1NH_3\cdot 1,9H_2O$ occurs in the temperature range from 343 to 1043 K and is accompanied, as show DTA and DTG curves, with three endothermic effects with minimums at 378, 553 and 640 K and the maximum of exothermic effect at 683 K. The chromatographic analysis of the sample selected at 423 K indicates that the loss of 1.0 mol of

ammonia and 0.9 mol of water is accompanied with the start of destruction of diphosphate anion and the sample turns into X-ray amorphous state. Reversed transformation of monophosphate ion into diphosphate one occurs at the temperature range 655-1043 K, accompanied with complete removal of ammonia and water and the formation of new crystalline two-phase sample with structure $0,5Zn_2P_2O_7 + 0,5Cd_2P_2O_7$.