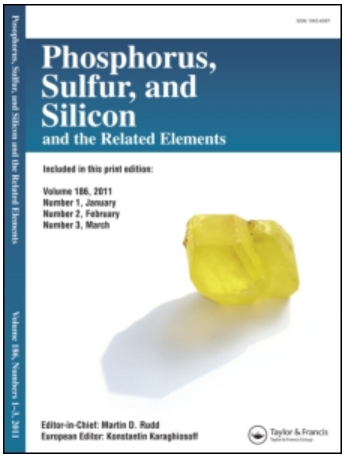

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Synthesis and Properties of Inorganic Triphosphate Crystal Hydrates

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SYNTHESIS AND PROPERTIES OF INORGANIC TRIPHOSPHATE CRYSTAL HYDRATES

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The polycrystalline samples and single crystals of crystal hydrates of inorganic triphosphates with ring-like and chain-like anion structured were synthesized: lithium and sodium cyclotriphosphates, sodium and ammonium chain triphosphates, and double salts of chain triphosphoric acid (ammonium-potassium, ammonium-magnesium, ammonium-manganese). The crystallization field of the double salt of variable composition $(NH_4,K)_3H_2P_3O_{10}\cdot xH_2O$ (NH_4:K=0.23-3.60; x=0.8-1.5) from aqueous solutions was established. Synthesis of $Na_5P_3O_{10}\cdot 6D_2O$ crystals has been performed by the interaction of the high temperature form $Na_5P_3O_{10}$ (I) with D_2O. At 20°C and relative humidity RH<70-80% the $(NH_4)_5P_3O_{10}\cdot 2H_2O$ crystals lose their transparency and generate different crystalline products depending on RH value: $(NH_4)_5P_3O_{10}$ at RH=0% or $(NH_4)_5P_3O_{10}\cdot H_2O$ at RH=32%. The $(NH_4)_5P_3O_{10}\cdot H_2O$ crystals are stable at RH<60-70%, at RH=80% they absorb water and transform into $(NH_4)_5P_3O_{10}\cdot 2H_2O$. In the latter case a characteristic picture is registered: on active sites situated on the $(NH_4)_5P_3O_{10}\cdot H_2O$ crystal face the appearance and epitaxial growth of $(NH_4)_5P_3O_{10}\cdot 2H_2O$ crystals is observed. For some single crystals the character of dehydration localization has been shown to correlate with space arrangement of phosphate groups in crystal structure. On the basis of the obtained results a model of dehydration front propagation in crystals has been suggested.