



Figure 1. Dependence between the cell volume calculated from X-ray data and Li concentration in $\text{Ca}_{2-x}\text{Li}_{2x}\text{GeO}_4$ solid solutions (square) – solid state synthesis. \blacktriangle (triangle) – single crystals grown from high-temperature Li_2MoO_4 - Ca_2GeO_4 solutions.

Keywords: oxide materials, solid state reactions, crystal growth, X-ray diffraction

MS51-P5 Growth crystals KDP from water solutions with KMnO_4

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Crystals of potassium dihydrogen phosphate are widely applied in science and techniques, medicine and industry. In this work we grew up crystals of potassium dihydrogen phosphate with potassium permanganate up by the temperature differential method with concentration convection condition in thermostat with constant degree of supercooling 3.5-4 °C. It was established KMnO_4 influence on the growth of KDP. The grown crystals have prismatic habit without pinching. Crystals got brown coloring, and it was visible that in sector of growth of a side of a prism concentration of manganese more than in sector of growth of a bipyramid. The structure of this crystal was defined by single crystal X-ray diffraction. X-ray diffraction data for this sample were obtained with Oxford Diffraction (Gemini S) diffractometer on graphite monochromatic Mo-K_α radiation ($\lambda=0.71073 \text{ \AA}$) and with CCD Sapphire III detector in the ω -scan mode at a room temperature. The crystal structure was solved by direct methods (Shelx97) and refined by full matrix method (Shelx97). The reflection data were processed by using an analytical absorption correction algorithm. The crystal structure was solved by direct methods and refined by full matrix method. All non-hydrogen atoms were refined with anisotropic correction. Hydrogen atoms were located from difference Fourier synthesis and refined isotropically. Potassium permanganate (KMnO_4) addition to the KDP (KH_2PO_4) solution increases the growth rate of the $\{100\}$ faces and decreases that of the $\{101\}$ ones. The complex ion MnHPO_4^{4+} is an impurity affecting $\{101\}$ face growth rate. The manganese-ion Mn^{3+} replaces the K^+ ion in the KDP structure and causes the change of hydrogen positions. The increase of the $\{100\}$ face growth rate is connected with the capture of MnO_2 particles. The doping of KDP crystals by manganese decreases the effective quadratic nonlinear sensitivity of crystals [D.A. Vorontsov, A.E. Egorova, E.L. Kim, M.O. Marychev, A.A. Petrova, V.N. Portnov, N.V. Somov. Vestnik of Lobachevsky State University of Nizhni Novgorod, 2010, №5(2), p. 210–213.]. The analysis of element structure of crystals was carried out on a Wavelength Dispersive X-Ray Fluorescence Spectrometer of Shimadzu Lab Center XRF-1800 on intensity K_α -line of characteristic x-ray radiation (HRI) of potassium and manganese. So concentration of atoms Mn was measured by Optical Emission Spectrometer Varian ICP-OES.

Keywords: growth crystal, KDP (KH_2PO_4), X-ray