0.3-0.8 for NYAB and about 1 for GYAB crystals. In the case of NYAB it increases with an increase in crystallization temperature and a decrease in the crystal growth rate.

The temperature and concentration ranges of the phase transitions were determined for these crystals by X-ray technique, microprobe analysis, optical and electron microscopy.

Referenses

1. L.M.Dorozhkin at all. *Pis'ma v ZhETF*, Vol.7, pp.1297-1299 (1981) (in Russian).
2. L.I.Leonyuk at all. Acoustoelectronics-89, Abstr, Varna, Vol.2, pp.459-461 (1989).
3. E.L.Belokoneva at all. *Kristallographia*, Vol.33, pp.1287-1288 (1988) (in Russian)

MS16.03.07 A NEW FLUX FOR THE RAPID GROWTH OF POTASSIUM TITANYL PHOSPHATE (KTiOPO4) SINGLE CRYSTAL. M. T. Sebastian, S. Suma, N. Santha, Electronic Ceramics Division, Regional Research Laboratory, Thiruvananthapuram-695 019, India

Single crystals of the well known non-linear and electro-optic material $KTiOPO_4$(KTP) has been grown using a new barium-potassium based complex phosphate flux. The solubility of KTP in this new flux is higher at high temperatures and low at low temperatures as compared to the conventional flux $K_6P_4O_{13}$. The new flux is less viscous and hence avoids the problem of glass formation and a higher cooling rate can be given. Good quality crystals of KTP up to 6mm in size can be grown in a day by giving a cooling rate of 120 °C/day. The KTP crystals grown in this new flux are transparent, free of inclusions or elements from the flux and OH incorporation. The use of this flux indicates the possibility of growing relatively large crystals commercially in a short time.

MS16.03.08 GROWTH KINETICS OF PROTEIN SINGLE CRYSTALS IN THE GEL ACUPUNCTURE TECHNIQUE. Abel Moreno[1], Juan Ma. Garcia-Ruiz[2] & Manuel Soriano-Garcia[1], [1]Instituto de Quimica-UNAM, C.U. Coyoacan 04510. Mexico, D.F., [2]Instituto Andaluz de Ciencias de la Tierra. C.S.I.C.-Universidad de Granada Campus Fuentenueva s/n 18002 Granada, Spain

This work presents the growth kinetics of protein crystal growth in the gel acupuncture technique. This new method has been proposed previously for the growth of protein single crystals [1]. The main advantage of the technique is that the crystals are obtained inside an X-ray capillary tubes. The growth of single crystals of lysozyme (HEW), Thaumatin within capillary tubes was monitored by time-lapse videomicroscopy. The crystals were obtained by diffusive transport of precipitating agent through capillaries of internal diameter ranging from 0.2 mm to 1.5 mm, using the gel acupuncture technique. For crystals growing from true protein solutions, the measured average growth rates varies with capillary diameter from 2.7 Å/s to 3.7 Å/s for thaumatin and from 2.8 Å/s to 22 Å/s for lysozyme. The measured average growth rates, for crystals growing into gelled protein solutions, were 1.8 Å/s for thaumatin and 2.5 Å/s for lysozyme. In all the cases, the trend in variation of the growth rate with time is similar and suggest that, for capillaries with internal diameter radius lower than 1.2 mm, protein crystals grow in gel and free solution under diffusive mass transport control. Finally, it is showed that the crystal growth rate depends on the height of the capillary tube where nucleation occurs and it is function of the internal diameter of the capillary tube.

Reference: 1. Moreno, A. Ph. D. Thesis, Universidad de Granada, Spain. (1995).

MS16.03.09 HYDROTHERMAL GROWTH AND TWINNING OF GALLIUM PHOSPHATE CRYSTALS. O.V.Zvereva and L.N.Demianets, Institute of Crystallography, RAN, Moscow, Russia

Modified hydrothermal method was developed for gallium orthophosphate single crystal growing. The concentrated mixture of phosphonc acids with the boiling temperature of 225°C was used as a growth media. Crystals were grown in the field of positive temperature coefficient of solubility (T>300°C) by the direct temperature gradient technique under the pressure of inert gas pumped into an autoclave to avoid the solvent boiling. The main features of the solubility and growth kinetics are presented.

Twinning laws and twin types were studied for gallium phosphate grown by modified hydrothermal method. The twins were found to be formed in accordance with Brazil, Douphine and Leydolt's laws; such twins are characteristic for 32 class symmetry.

Brazil twins are typical for $GaPO_4$ single crystals. Douphine and Leydolt's twins occur very rear. The main specific feature of Brazil twins is an appearance of two planes of twinning right and left individuals; one plane $\pi(10.2)$, similar to quartz, berlinite and $GaPO_4$ crystals grown hydrothermaly at T<300°C. The second plane is the other rhombohedron $\pi'(01.2)$. Earlier such twinning was not found in crystals grown at low temperature.

The quantity of twins depends very much on crystallographic orientation of initial seeds. To eliminate the twin quantity, the specific orientation, shape and size of seeds were found on the base of crystallographic and kinetic data for gallium phosphate single crystal growth.

PS16.03.10 SINGLE CRYSTAL GROWTH OF Sr_2RuO_4 BY LASER-HEATED PEDESTAL GROWTH (LHPG). Y. P. Mascarenhas, D. Reyes Ardila, M. R. B. Andreeta, S. L. Cuffini, A. C. Hernandes, J. P. Andreeta, Instituto de Fisica de São Carlos, Universidade de São Paulo, C. P. 369, 13560-970, Sao Carlos, SP, Brazil

Sr_2RuO_4 was reported in 1994 (1) as the first non-cuprate layered perovskite that is superconducting near 1K. Although its Tc is so low, this layered oxide compound is the first directly relevant superconductor, without copper, for comparison with the high-Tc cuprates. Besides, this results demonstrated that the presence of copper is not a prerequisite for the existence of superconductivity in layered perovskite compounds. Up to now, the method used in the preparation of single crystal was floating zone melting (2). We report, for the first time to our knowledge, the growth of Sr_2RuO_4 single crystal fibers by Laser-Heated Pedestal Growth (LHPG) technique. The fibers obtained were up to 20mm in length with 0.8-1.0 mm in diameter. They were easily cleaved, yielding plate-like crystal with (001) surface. Sr_2RuO_4 compound has K_2NiO_4 structure with space group I4/mmm and lattice parameters a = 3.861 (1) A and c=12.701(3)A, which are in good agreement with the previous reports (3). The single crystal fibers were characterized by SEM, EPMA and X-ray diffraction using Laue method and single crystal difractometer (CAD-4 Enraf-Nonius).

(1) Y. Maeno, H. Hashimoto, K. Yoshida, S. Nishizaki, T. Fujita, J. G. Bednorz and F. Lichtenberg, Nature Vol. 372, p. 532 Dec. (1994).
(2) F. Lichtenberg, A. Catana, J. Mannhart and D. G. Schlom, Appl. Phys. Lett. 60, 1138-1140 (1992).
(3) L. Walz, F. Lichtenberg, Acta. Cryst. C49, 1268-1270 (1993).

Acknowledgement: FAPESP, CAPES, CNPq, FINEP.