

Phase equilibria and single crystal growth of $\text{Ln}_{1-x}\text{Ca}_x\text{Sr}_2\text{Cu}_2\text{GaO}_7$ (Ln=Y, Ho)

Donggeun Ko, Claude L. Mertzenich, Sophie Boudin,
Charlotte L. Stern, Kenneth R. Poeppelmeier

Abstract

Undoped and calcium doped $\text{Ln}_{1-x}\text{Ca}_x\text{Sr}_2\text{Cu}_2\text{GaO}_7$ (Ln = Y, Ho) crystals were grown for the 1st time using a 0.2SrO/0.8CuO flux by slow cooling through the crystn. region detd. from the phase diagram. DTA and x-ray powder diffraction were used to construct the phase diagram, which revealed a soly. of .apprx.10 mol% in the flux without the appearance of peritectic decompn. products. Square plate crystals with $\leq 2 \times 2 \times 0.5 \text{ mm}^3$ were obtained by a combination of slow cooling and thermal cycling. EDS x-ray anal., x-ray powder diffraction and single crystal x-ray diffraction were used to confirm their stoichiometry and structure. Single crystals of $\text{Y}_{1-x}\text{Ca}_x\text{Sr}_2\text{Cu}_2\text{GaO}_7$ with a nominal compn. of $x = 0.2$ are superconducting with T_{conset} .apprx. 100 K.

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