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Growth of $La_{2-x}Sr_xCuO_4$ Single Crystals for Device Application

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We had succeeded to grow bulk single crystals of $La_{2-x}Sr_xCuO_4$ by the traveling solvent floating zone method (TSFZ) [1]. Using these single crystals, their physical properties gave us valuable information on the mechanisms of the high T_c-superconductivity. Furthermore, new phenomenon of $La_{2-x}Sr_xCuO_4$ single crystals, Josephson plasma phenomenon, had been discovered, and the single crystals are expected to application for high-speed electronics devices such as low-noisy magnetic vortex sensors and THz band oscillators. The large anisotropic and pining-free single crystals of the high-T_c superconductors are necessary to be applied for these electronics. In special, a_{tetra}-axis orientated single-crystalline films of thickness of micron-order would be more desirable for the processing and development of electronic devices. Recently, we have developed new liquid phase epitaxial technique using an infrared heating furnace (IR-LPE) to grow $La_{2-x}Sr_xCuO_4$ single-crystalline thick films [2]. In this presentation, I review growth of bulk single crystals and single-crystalline thick films of $La_{2-x}Sr_xCuO_4$, and discuss on their device properties.

1) I. Tanaka and H. Kojima, Nature **337**, 21 (1989).
2) I. Tanaka *et al.*, Physica C **362(1-4)**, 180 (2001).

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