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Growth and superconductivity of single crystals $\mathbf{La_{1.875}Ba_{0.125}CuO_4}$ GENDA GU, GUANGYONG XU, J. TRANQUADA, Physics Dept., BNL, Q. LI, A. MOODENBAUGH, Materials Sci. Dept., BNL, H. GOKA, K. YAMADA, Tohoku University, Japan, GENDA GU TEAM[1], Q. LI TEAM[2], H. GOKA TEAM[3] — The origin of high temperature superconductivity in cuprate materials is one of the biggest puzzles in material science. Since the discovery of the significant anomalous suppression of superconductivity in high temperature superconducting oxide $La_{2-x}Ba_xCuO_4$(x=1/8) [1], the so-called 1/8 anomaly has been a subject of considerable research attention. Many attempts to grow the single crystals have been made, but no single crystal $La_{2-x}Ba_xCuO_4$(x=1/8) has been successfully grown. In this work, the effects of the growth condition and the compositions of a feed rod on the crystal growth of $La_{2-x}Ba_xCuO_4$has been studied by an infrared image floating zone method. The experimental result shows that a planar solid-liquid growing interface tends to break down into a cellular interface when the growth velocity is more than 1 mm/h. When the planar solid-liquid growing interface break down into a cellular interface, the single crystal size decreases abruptly and the as-grown rod is not single phase. The large single crystals of $La_{2-x}Ba_xCuO_4$(x=1/8) has been successfully grown. The single crystals of $La_{2-x}Ba_xCuO_4$(x=1/8) up to 8 mm diameter and 55 mm length have been cut from the as-grown bars. The superconductivity transition temperature T_c of as-grown single crystals is 2.5 K. The static stripe order in the large single crystals has been studied by neutron scattering method[2]. [1] A. R. Moodenbaugh *et al*, Phys. Rev. B, 38(1988)4596. [2] J. M. Tranquada *et al*, Nature, 429(2004)534.

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