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Growth and superconductivity of large single crystals (La1-xCax)2CaCu2O6+y GENDA GU, RUIDAN ZHONG, JOHN SCHNEELOCH, KIM MOHANTY, Comdensed Matter Physics & materials Science Department, Brookhaven national laboratory, GUANGYONG XU, Comdensed Matter Physics materials Science Department, Brookhaven national laboratory, QIANG LI, JOHN TRANQUADA, Comdensed Matter Physics & materials Science Department, Brookhaven national laboratory — The effects of the growth velocity and the compositions of a feed rod on the crystal growth of (La1-xCax)2CaCu2O6+y (x = 0.065 and 0.15) (La-2126 phase) has been studied by an infrared image floating zone method. A planar solid-liquid growing interface tends to break down into a cellular interface when the growth velocity is more than 0.5 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. As-grown single crystals of (La1-xCax)2CaCu2O6+y (x = 0.065 and 0.15) (La-2126 phase) at 1 bar pressure of oxygen is paramagnetic. After annealing the single crystal in a hot isostatic press machine at 7000 bars of a mixed gas of 20%oxygen+80%Ar at 1473 K, the superconducting transition temperature of the single crystal is as high as 61 K.

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