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The model high-T_C superconductor $HgBa_2CuO_{4+\delta}$: a quantitative annealing, transport and magnetic susceptibility study NEVEN BARISIC, YUAN LI, GUILLAUME CHABOT-COUTURE, YU GUICHUAN, Stanford University, YONGCHAN CHO, Pusan National University, XUDONG ZHAO, Jilin University, MARTIN GREVEN, Stanford University, GREVEN TEAM — The investigation of the physical properties of high-T_C superconductors (HTSCs) is complicated by several materials-related obstacles. In order to obtain reliable experimental results, homogeneous single crystals are needed, which are difficult to obtain due to chemical and/or electronic disorder. $HgBa_2CuO_{4+\delta}$ (Hg1201) is a particularly interesting HTSC, since it possesses the highest superconducting transition temperature (T_C=97 K) among single Cu-O layer compounds, a simple crystal structure, and the property to confine disorder relatively far a way from the superconducting pivotal Cu-O layers. Recently, we reported a new recipe for the growth of unprecedentedly large, gram-sized monocrystals of Hg1201 [1]. Here, we demonstrate that it is possible to select samples of the highest quality, with very few vortex pinning centers, and to dope them uniformly over a wide range of hole concentration. Furthermore, we show that those crystals can be cleaved and contacted with high-quality electrical contacts. These results make Hg1201 a particularly interesting model system for extensive experimental investigation. [1] X. Zhao et al., Adv. Mater. 18, 3243 (2006)

Martin Greven
Stanford University

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