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Electron-tunneling measurements of low-Tc single-layer Bi-2201 cuprates TH. JACOBS, S.O. KATTERWE, H. MOTZKAU, A. RYDH, Department of Physics, Stockholm University, Sweden, A. MALJUK, Leibniz Institute for Solid State and Materials Research IFW Dresden, Germany, T. HELM, M.V. KARTSOVNIK, WMI, Bayerische Akademie der Wissenschaften, Garching, Germany, C. PUTZKE, H. H. Wills Physics Laboratory, University of Bristol, United Kingdom, E. KAMPERT, HZDR, Hochfeld-Magnetlabor Dresden, Germany, V.M. KRASNOV, Department of Physics, Stockholm University, Sweden — The single-CuO_2 plane cuprate superconductor $Bi_{2+x}Sr_{2-y}CuO_{6+\delta}$ (Bi-2201) is characterized by a low critical temperature and a relatively low upper critical field. This allows a complete suppression of superconductivity even at low T and opens a possibility to study the normal-state properties with a relatively low interference of thermal fluctuations. Furthermore, the understanding of T_c suppression in Bi-2201 is of great significance for understanding the mechanism of high T_c in other cuprates. We present intrinsic tunneling and high magnetic field (up to 65 T) transport measurements of Bi-2201 single crystals with a T_c of only ~ 4 K. All superconducting characteristics are reduced proportional to T_c, but the corresponding c-axis pseudogap characteristics remain similar to that in high-T_c Bi-2212 and Bi-2223 compounds with 20-30 times larger T_c. This scaling disparity reveals the different origin of superconducting and pseudogap states. We also conclude that the low T_c in our Bi-2201 crystals is not caused by strong thermal fluctuations at low T, nor by crystal defects, but is the consequence of a weaker coupling, leading to a small Cooper pair energy.

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