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Generic phase diagram of "electron-doped" T' cuprates M. NAITO, O. MATSUMOTO, A. UTSUKI, Tokyo University of Agriculture and Technology, A. TSUKADA, Stanford University, H. YAMAMOTO, NTT BRL, T. MANABE, AIST — The electronic phase diagram of cuprate superconductors is a key ingredient to understand the still unresolved mechanism of high-temperature superconductivity. A particular interesting question is the differences and similarities between the hole- and electron-doped sides. The phase diagram of hole-doped high-T_c cuprates has been well established, and shows a well-known "dome" shape with maximal superconductivity at a doping level of about 0.15. In contrast, the phase diagram of the electron-doped side is controversial. This is because the superconductivity in the T$'$ cuprates deteriorates seriously by the presence of impurity oxygen (O_{ap}) atoms, which have to be cleaned up in order to unveil the generic phase diagram of the T'-cuprates. We investigated the generic phase diagram of the electron doped superconductor, $Nd_{2-x}Ce_xCuO_4$, using films prepared by metal organic decomposition. After careful oxygen reduction treatment to remove interstitial O_{ap} atoms, we found that the T_c increases monotonically from 24 K to 29 K with decreasing x from 0.15 to 0.00, demonstrating a quite different phase diagram from the previous bulk one. The implication of our results is discussed on the basis of tremendous influence of O_{ap} "impurities" on superconductivity and also magnetism in T' cuprates.

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