

Abstract Submitted
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Revised superconducting phase diagram of hole doped $\text{Na}_x\text{CoO}_2 \cdot y\text{H}_2\text{O}$ C.J. MILNE, D.N. ARGYRIOU, A. CHEMSEDDINE, N. ALIOUANE, J. VEIRA, S. LANDSGESELL, D. ALBER, Hahn-Meitner-Institut, Glienicker Str. 100, Berlin D-14109, Germany — We have studied the superconducting phase diagram of $\text{Na}_x\text{CoO}_2 \cdot y\text{H}_2\text{O}$ as a function of electronic doping, characterizing our samples both in terms of Na content x and the Co valence state.[1] Our findings are consistent with a recent report that intercalation of H_3O^+ ions into Na_xCoO_2 , together with water, act as an additional dopant indicating that Na sub-stoichiometry alone does not control the electronic doping of these materials. We find a superconducting phase diagram where optimal T_c is achieved through a Co valence range of 3.24 - 3.35, while T_c decreases for materials with a higher Co valence. The critical role of dimensionality in achieving superconductivity is highlighted by similarly doped non-superconducting anhydrous samples, differing from the superconducting hydrate only in inter-layer spacing. The increase of the interlayer separation between CoO_2 sheets as Co valence is varied into the optimal T_c region is further evidence for this criticality.[1] C.J. Milne *et al.*, *Phys.Rev.Lett.*, in press (2004). Also cond-mat/0401273.

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