

# Superconducting Phase Diagram of the Sodium Cobalt Oxyhydrates $\text{Na}_x\text{CoO}_2 \cdot y\text{H}_2\text{O}$

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A characteristic feature of the cuprate superconductors is the existence of an optimal electronic doping regimes. That is thought to be a universal characteristic of cuprate superconductors. Recently, this feature of the cuprates has been challenged for the new superconductor, sodium cobalt oxyhydrates  $\text{Na}_x\text{CoO}_2 \cdot y\text{H}_2\text{O}$ .

To determine the properties of this novel superconductor  $\text{Na}_x\text{CoO}_2 \cdot y\text{H}_2\text{O}$  as a function of electronic doping, we have synthesized a series of polycrystalline samples with varying Na content  $x$ . Deintercalation of Na and oxidation was performed using oxidizing agent  $\text{KMnO}_4$ . The superconducting properties were characterized using a quantum design SQUID magnetometer. The Na/Co ratio of the products was measured using ICP-AES. Co oxidation state was measured by redox titration.

By controlling the amount of Na chemically and measuring directly the Co valence, we have tried to draw a superconducting phase diagram using a series of samples over the broad range of cobalt valence.