Crystal Structure of the Sodium Cobaltate Deuterate Superconductor NaxCoO2.4xD2O.
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Commentary by Zachary Fisk, University of Florida, Tallahassee.

The latest addition to the expanding field of oxide superconductors is the Tc = 4.5K water intercalated NaxCoO2. Exactly what is special about water here, if anything other than as an intercalating agent between Co oxide planes, is an important question, which this report by Jorgensen et al. puts in new perspective. They find that in the optimal Tc material each Na carries four waters of hydration, and that the resulting structure is just slightly below the x = 1/3 stoichiometric NaxCoO2.4xD2O composition. We have a compound here, not an intercalation product, and this quite alters how one thinks about the material and opens ones thinking to an interestingly broadened phase space for new super conducting materials.

That a bona fide hydrate becomes super conducting is a wonderful affront to what might be called the folklore of super conducting materials. The remarkable proliferation of superconductors being found now in such varied chemical venue is continuing to press the perimeter of our understanding of metals and their low temperature properties.