Na atomic order, Co charge disproportionation and magnetism in NaₓCoO₂ for large Na contents

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Room 525 Lecture Room No. 4
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要旨：Sodium cobaltates NaₓCoO₂ display diverse physical behaviours depending upon Na content. The control of carrier content of the CoO₂ planes by varying Na concentration between the planes yields a totally counter-intuitive sequence of magnetic properties including anomalous paramagnetism, charge disproportionation, metallic antiferromagnetism.

This talk will be devoted to the results of our investigations of the x>0.5 phases of the sodium cobaltates by the ²³Na and ⁵⁹Co nuclear magnetic (NMR) and quadrupolar (NQR) resonances, as well as by SQUID magnetometry and X-ray diffractometry.

The characteristic feature of the large Na content phases is a very definite order of the Na⁺ ions and of the Co charges in the CoO₂ planes. In all studied phases we display evidences that the Co disproportionate already above 300 K into non-magnetic Co³⁺ and magnetic ≈Co³.5⁺ sites on which holes delocalize. This allows us to understand that metallic magnetism is favored for these large Na contents and resolve a puzzling issue by precluding localized moments pictures for the magnetic properties.

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