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NMR studies of Na_xCoO_2[1]

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Sodium cobaltate Na_xCoO_2 is the parent phase of triangular-lattice superconductor $Na_{1/3}CoO_2$-$[H_2O]_{4/3}$. Co ions take a mixed-valence state of +4-x in this system. Since Co^{4+} and Co^{3+} possess spin S=1/2 and S=0, respectively, one may view the CoO_2 layers as charge doped S=1/2 triangular-lattice. CoO_2 layers exhibit a rich variety of strongly correlated electron behavior as a function of sodium concentration x, ranging from itinerant antiferromagnet (x$\sim$0.84 and 0.5), "Curie-Weiss metal" (x$\sim$0.71) to Fermi liquid (x$\sim$1/3). In this talk, I will discuss our NMR studies of Na_xCoO_2 for various Na concentration x, with particular emphasis on ^{59}Co evidence for charge ordering in the insulating ground state of $Na_{0.5}CoO_2$ [1-4].

[1] F.L. Ning et al., arXiv : 0711.4023
[2] F.C. Chou et al., arXiv : 0709.0085
[3] F.L. Ning et al., PRL 94, 227004 (2005)
[4] F.L. Ning et al., PRL 93, 237201 (2004)

[1]This work was carried out in collaboration with F.L. Ning, S. Golin, K. Ahilan (McMaster), F.C. Chou, M.-W. Chu, G.J. Shu, F.T. Huang, Woei Wu Pai, H.S. Sheu (National Taiwan University) and P.A. Lee (M.I.T.).