Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Novel sodium ordering on a NaxCoO2 surface WOEI WU PAI, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, S.S. HUANG, Department of Physics, National Normal Taiwan University, Taipei, Taiwan, C.H. LIN, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan, H. S. HSUE, National Synchrotron Radiation Center, Hsin-Chu, Taiwan, F.C. CHOU, Center for Condensed Matter Sciences, National Taiwan University, Taipei, Taiwan — The conducting layered sodium cobaltate, NaxCoO2, has generated great research interests recently. This material exhibits surprising properties as the Na concentration x is varied. Despite intense studies, Na ordering and its subtle interplay with charge ordering in the CoO2 layer remains unclear. Here we report the first direct observation of Na ordering on a NaxCoO2 surface (x=0.84) with scanning tunneling microscopy. Three distinct Na phases, all of hexagonal symmetry, were identified. These new findings did not fit any theoretical prediction at present. Plausible structure models were proposed. In additional, an one-dimensional stripe modulation on the surface was discovered, which was found to be a bulk phenomenon as well. Our results should prompt more detailed theoretical investigations into the mechanism of Na ordering.

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Date submitted: 26 Nov 2006 Electronic form version 1.4