Probing defect ordering in the Curie-Weiss metallic phase of \( \text{Na}_x\text{CoO}_2 \)

BEN-LI YOUNG, P.-Y. CHU, J.Y. JUANG, Dept. of Electrophysics, Natl Chiao Tung Univ., G.J. SHU, F.C. CHOU, Center for Condensed Matter Sciences, National Taiwan Univ. — Single crystals of \( \text{Na}_{2/3}\text{CoO}_2 \), \( \text{Na}_{2/3}\text{CoO}_{1.98} \), and \( \text{Na}_{0.71}\text{CoO}_2 \), which are metallic Curie-Weiss paramagnets, have been investigated by nuclear magnetic resonance (NMR) techniques, in order to clarify the Na atomic ordering among these samples. By analyzing the \( ^{23}\text{Na} \) and \( ^{59}\text{Co} \) NMR spectra, we confirm that the Na vacancies arrange orderly in \( \text{Na}_{2/3}\text{CoO}_{1.98} \) and \( \text{Na}_{0.71}\text{CoO}_2 \), so that a superlattice structure is formed due to such Na ordering. In addition, the oxygen vacancies in \( \text{Na}_{2/3}\text{CoO}_{1.98} \) can be located by the NMR spectra. As for the \( \text{Na}_{2/3}\text{CoO}_2 \) single crystal, a long-range Na order is not observed.

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