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Various magnetic ground states linked to sodium ordering pattern via controlled cooling in Na_xCoO_2 ($x \approx 0.75$-0.85) J. KANTER, V. WITTWER, T. SCHULZE, P. HAEFLIGER, S. PETITJEAN, Laboratory for Solid State Physics, ETH Zurich, Switzerland, D. SHEPTYAKOV, CH. NIEDERMAYER, Laboratory for Neutron Scattering, PSI Villigen, Switzerland, K. MATTENBERGER, B. BATLOGG, Laboratory for Solid State Physics, ETH Zurich, Switzerland — Detailed characterization is presented of a recently found link between the low temperature magnetic properties of Na_xCoO_2 and a sodium rearrangement process at the onset of sodium mobility around 200 K. Switching between different sodium ordering patterns is possible by adjusting the cooling speed, due to the long time constant of the sodium rearrangement. The various magnetic states (with T_c of 8, 15 and 22 K) are characterized by transport, magnetization, specific heat and thermal expansion measurements and linked to the sodium ordering process. The magnetic field dependence of the transition temperatures and the magnetic anisotropy were studied in detail. Muon Spin Rotation experiments confirmed the true bulk character of the magnetic transitions and locally probed the different phases. Single crystal diffraction data links the different magnetic ground states to structural changes.

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