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Resonant Ultrasound Studies of Quasi-2D Na_xCoO_2 ($0.7 \leq x \leq 0.77$) TIMOTHY CAGLE, VEERLE KEPPENS, Department of Materials Science and Engineering, The University of Tennessee, RONGYING JIN, Materials Science and Technology Division, Oak Ridge National Laboratory — Cobalt-based oxides have been shown to represent a new paradigm for a good thermoelectric material. These materials violate all of the traditional guidelines to help identify a potentially good thermoelectric material. In order to obtain a better understanding of its physical properties, we have initiated the synthesis of layered Na_xCoO_2, and started a study of the elastic properties of these materials using Resonant Ultrasound Spectroscopy (RUS). In this work, we discuss our results for sodium cobaltate compounds with $0.7 \leq x \leq 0.77$. Single crystals were successfully grown in a floating-zone furnace, and the elastic constants have been measured as a function of temperature (5-300K) and in magnetic fields up to 5 Tesla. The resulting plots of elasticity vs. temperature clearly reflect a transition below 50 K, which is believed to be associated with rearrangement of the Na-atoms between the CoO_2 planes.

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