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Enhancement of the Curie temperature in $NdBaCo_2O_{5.5}$ by Ca substitution[1] S. KOLESNIK, B. DABROWSKI, O. CHMAISSEM, Department of Physics, Northern Illinois University, DeKalb, IL and Materials Science Division, Argonne National Laboratory, Argonne, IL, K. SWIERCZEK, Materials Science Division, Argonne National Laboratory, Argonne, IL and University of Science and Technology, Krakow, Poland — $RBaCo_2O_{5.5}$ (R=rare earth or Y) undergoes a sequence of magnetic and electronic transitions between antiferromagnetic/ferrimagnetic/paramagnetic and insulating/paramagnetic metallic states with respective transition temperatures T_N(230-260 K)<T_C(250-290 K)<T_{MI}(∼360 K). We have synthesized a $Nd_{1-x}Ca_xBaCo_2O_{5.5}$ series ($0 \leq x \leq 0.2$) of cation-[(Nd,Ca)/Ba] and oxygen vacancy ordered materials and investigated them by neutron diffraction, magnetization, electronic and thermal transport. We observe that upon Ca doping T_N is decreasing to 0 for x=0.1 and T_C is increasing and coincides with T_{MI} for x>0.12, which weakly changes with Ca substitution from ∼360 to ∼340 K. This is the largest enhancement of T_C ever observed for these cobaltites. Unlike the hole doping by adding oxygen, the Ca doping does not disrupt the cation and oxygen vacancy orderings up to x=0.2.

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