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Thermoelectric Properties of the Chemically Doped $Ca_3Co_4O_9$System: A Structural Perspective TAO WU, TREVOR TYSON, Department of Physics, New Jersey Institute of Technology, HSIN WANG, High Temperature Materials Laboratory, Oak Ridge National Laboratory, QIANG LI, Condensed Matter Physics and Materials Science Department, Brookhaven National Laboratory, DEPARTMENT OF PHYSICS, NEW JERSEY INSTITUTE OF TECHNOLOGY TEAM, HIGH TEMPERATURE MATERIALS LABORATORY, OAK RIDGE NATIONAL LABORATORY COLLABORATION, CONDENSED MATTER PHYSICS AND MATERIALS SCIENCE DEPARTMENT, BROOKHAVEN NATIONAL LABORATORY COLLABORATION — Cu doped and Y doped $[Ca_2CoO_3][CoO_2]_{1.61}$ (referred to as $Ca_3Co_4O_9$) were prepared by solid state reaction. Temperature dependent thermoelectric properties, resistivity (ρ), Seeback coefficient (S) and thermal conductivity (κ), were measured. As seen before, it is found that doping by Cu and Y significantly enhances the thermoelectric properties. In order to understand the origin of these changes in properties in terms of the atomic structure, synchrotron x-ray diffraction and x-ray absorption spectroscopy were applied to probe the change in the average structure and the location of the dopants. The details of the location and coordination of Co and Y in the host lattice and the effect on the figure of merit are discussed. This work is supported by DOE Grant DE-FG02-07ER46402.

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