Large Magnetoelastic Coupling in Pr$_2$CuO$_4$ Single Crystals
DAVID MANDRUS, RONGYING JIN, BRIAN SALES, Oak Ridge National Laboratory — The in-plane thermal conductivity, $\kappa_a$, of insulating Pr$_2$CuO$_4$ was measured at low temperatures and in magnetic fields of up to 8 Tesla. At 5 K and 8 Tesla $\kappa_a$ increases by 50% for $H \parallel a$, and 300% for $H \parallel c$, relative to its value in zero magnetic field. This increase is most likely due to the ability of the magnetic field to mix the non-magnetic ground state of the Pr 4f crystal field level with the first excited crystal field level at 18 meV. The magnetic field produces a substantial magnetic moment at each Pr site as well as a significant change in the 4f charge distribution. Either effect could significantly alter the heat conducted by acoustic phonons. Oak Ridge National Laboratory is managed by UT-Battelle, LLC, for the U.S. Dept. of Energy under contract DE-AC05-00OR22725.

David Mandrus
Oak Ridge National Laboratory

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