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Effect of Carbon Nanotubes on Transport Properties of MgB_2[1]

DEREK CAPLINGER, DANHAO MA, Department of Physics, The Pennsylvania State University, Altoona College, Altoona, PA 16601, USA, RUWANTHA JAYASINGHA, Department of Physics & Astronomy, University of Louisville, Louisville, KY 40292, USA, KOFI ADU, Department of Physics, The Pennsylvania State University, Altoona College, Altoona, PA 16601, USA, GAMINI SUMANASEKERA, Department of Physics & Astronomy, University of Louisville, Louisville, KY 40292, USA — Carbon nanotubes (CNT) and magnesium diboride (MgB_2) are two fascinating materials; with CNT exhibiting unique quantum electrical properties due to its 1-D structure and MgB_2 being a superconducting with transition temperature (T_c) at ∼40 K. We report preliminary results on the effect of carbon nanotubes on the temperature dependent (300K to 4K) thermoelectric power (TEP) and resistivity of MgB_2. The normalized resistance $(R\text{-}R_{300})/R_{300}$ shows very little dependence on the sample composition; however, the absolute resistance increases with increasing CNT concentration. At high CNT composition, the TEP mimic the characteristic TEP of CNT. However at low CNT composition, we see an upturn at about 30K.

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