Phase diagram for Bi$_{1-x}$C$_x$MnO$_3$ ($x < 0.4$) YUHAI QIN, TREVOR TYSON, New Jersey Institute of Technology, SANG-WOOK CHEONG, Rutgers University, XIAO-NONG XU, Nanjing University — The multiferroic BiMnO$_3$ system, in which ferroelectronic and ferromagnetic orders can coexist, has attracted much research work in the past years for its potential technological applications. For the more general system Bi$_{1-x}$C$_x$MnO$_3$, the phase diagram for the Ca rich region ($x > 0.4$) has been established[1]. In order to understand the multiferroic behavior near the x=0 system, the hole-doped region (0 < x < 0.4) was investigated. We have completed the magnetic, transport, and structural phase diagram of Bi$_{1-x}$C$_x$MnO$_3$, by performing detailed structural (XRD and XAFS), magnetization (ZFC/FC) and electrical measurements on Bi$_{1-x}$C$_x$MnO$_3$ (0 < x < 0.4), showing the transition form the highly distorted monoclinic phase to the orthorhombic phase. This work is supported by NSF DMR-0512196 and DOE Grant DE-FG02-07ER46402. [1] H. Woo, et al, Phys. Rev. B: Condensed Matter and Materials Physics 63, 134412/1 (2001).