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Physical Properties of Fe-doped $Ba(Mn_{1-x}Fe_x)_2Sb_2$ Single Crystals ZHENYU DIAO, JIANNENG LI, AHMAD US SALEHEEN, TAPAS SAMANTA, W.ADAM PHELAN, SHANE STADLER, RONGYING JIN, Department of Physics and Astronomy, Louisiana State University — $BaMn_2Sb_2$ forms the $ThCr_2Si_2$-type crystal structure and has the magnetic semiconducting ground state. In attempt to alter its ground-state properties, Mn is partially substituted by Fe resulting in $Ba(Mn_{1-x}Fe_x)_2Sb_2$. While the doped system remains the same structure for $x \leq 0.5$, its electrical and thermal conductivity decreases with increasing x, suggesting that doping-induced disorder plays an important role. Magnetically, we find that, with increasing x, the magnetic transition temperature T_M decreases (from 700 K for $x = 0$ to 500 K for $x = 0.5$) but magnetic susceptibility increases above and below T_M. These and low-temperature magnetization anisotropy suggest the canted-antiferromagnetic configuration with net magnetic moment in $BaMn_2Sb_2$. The antiferromagnetic interaction is gradually suppressed upon Fe doping, leading to the enhanced ferromagnetic component in $Ba(Mn_{1-x}Fe_x)_2Sb_2$.

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