

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Infrared spectroscopy of Cr and V doped Sb_2Te_3 : dilute magnetic semiconductors¹ DAVID CRANDLES, JASON MANSON, ANTHONY MADUBUONU, Department of Physics, Brock University, Canada, CTIRAD UHER, Department of Physics, University of Michigan, USA, PETR LOSTAK, Department of General and Inorganic Chemistry, Faculty of Chemical Technology, University of Pardubice, Czech Republic — Temperature dependent optical reflectance measurements on well characterized samples of non-intentionally doped, Cr-doped and V-doped Sb_2Te_3 show that both the parent compound and the Cr-doped version are narrow-gap semiconductors ($E_g \approx 0.25$ eV) with a conventional Drude free carrier absorption. The carrier density increases slightly with decreasing temperature while the scattering rate increases quadratically with temperature which is a sign of optical phonon scattering. Vanadium doping introduces a change in the temperature dependence of the scattering rate as well as higher electrical resistivity than Cr-doped Sb_2Te_3 . An analysis of the literature values of the saturation magnetization for $H \parallel c$ suggests that V is in a mixed valence state $\text{V}^{3+}/\text{V}^{4+}$.

¹Work support by NSERC

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Date submitted: 14 Nov 2014

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