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Raman study of the Verwey transition in Magnetite at high-pressure and low-temperature; effect of doping[1] L. GASPAROV, University of North Florida, Jacksonville, Fl, V. STRUZHKIN, A. GAVRILIUK[2], Geophysical Laboratory, Carnegie Institution of Washington, Washington, DC , H. BERGER, EPFL, Lausanne, Switzerland — We report high-pressure low-temperature Raman studies of the Verwey transition in pure and Al –doped magnetite (Fe_3O_4). Low temperature phase of magnetite displays a number of additional phonon modes that serve as transition markers. The diamond anvil cell in combination with these transition markers allows us to investigate the effect of hydrostatic pressure on the transition temperature. Pure magnetite displays nearly linear decrease of the transition temperature with increase of pressure yielding dTv/dp= -5 K/GPa. In contrast, Al-doped magnetite (T_V=123K) displays reduced slope of the PT curve at low temperatures and high pressures with overall dT_v/dp around -10 K/GPa. These dependences are directly related to the changes of the molar entropy and molar volume at the transition. We compare the data obtained in our Raman experiment with that obtained from the ambient pressure specific heat measurements.

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