

Abstract Submitted
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The Electronic and Lattice Vibrational Properties of various ground states of Ge-doped FeGa₃.¹ TENZIN SHERPA, PRITHIVI RANA, AASHISH POUDEL, Ramapo College of NJ, RODICA MARTIN, Montclair State University, IHOR SYDORYK, Ramapo College of NJ, PETROVIC CEDOMIR, Brookhaven National Laboratory, WEIJUN REN, Brookhaven National Laboratory, Research Center of Topological Functional Materials and Henan Key Laboratory of Photovoltaic Materials, Henan Univers., CATALIN MARTIN, Ramapo College of NJ — FeGa₃ has been investigated for its large thermopower effect at low temperatures, and the effects of electron correlations such as insulator to metal crossover, non-Fermi liquid behavior, and ferromagnetism. Furthermore, a ground state crossover from an insulator to paramagnetic and then to a ferromagnetic metal has been observed in Ge-doped FeGa₃. The large thermopower effect has been discussed to be a result of strong electron correlations or of the electron-phonon drag effect. In this study, we present the optical reflectance measurements for single crystals of FeGa_{3-x}Ge_x, for different values of x. The measurements were taken at varying temperatures from 300K to 5K, over a frequency range of 40 cm⁻¹ to 50000 cm⁻¹. We use Kramers-Kronig transformation to obtain various optical functions and compare the electronic and lattice vibrational properties of different ground states formed by Ge-substitution at Ga sites in FeGa₃. We also discuss that our observations show that the electron-phonon drag effect may have a greater contribution in the large thermopower effect.

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