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Inelastic neutron scattering study of $YBaFe_2O_5$ SUNG CHANG, Ames Laboratory, P. KAREN, Department of Chemistry, University of Oslo, M. P. HEHLEN, F. R. TROUW, Los Alamos National Laboratory, R. J. MCQUEENEY, Department of Physics and Astronomy and Ames Laboratory — $YBaFe_2O_5$ belongs to a new class of oxides with the chemical formula $R\mathrm{Ba}M_2\mathrm{O}_5$ (R = rare-earth, M = transition metal), based on the perovskite structure with a doubled unit cell pyramids of five-coordinated M-sites. The M-site is mixed valent in the stoichiometric formula unit (with an average valence of +2.5). Therefore, charge and orbital ordering phenomena can exist on the M-site and be studied without introducing disorder. The charge ordered phase of $YBaFe_2O_5$ is unusual, since it does not satisfy the Anderson criterion (i.e. it is not the lowest energy electrostatic arrangement of charges), but rather orders into alternating chains of 2+/3+. This indicates that other interactions, such as electron-phonon coupling, are necessary to arrive at the chain structure. Here, we present the results of an inelastic neutron scattering study of polycrystalline $YBaFe_2O_5$. We find the spectrum of phonon and magnetic excitations are clearly modified at the charge- and magnetic ordering temperatures: T_{CO} = 308 K and T_N = 430 K, respectively.

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