

Abstract Submitted
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Inelastic neutron scattering study of YBaFe_2O_5 SUNG CHANG,
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Department of Physics and Astronomy and Ames Laboratory — YBaFe_2O_5 belongs
to a new class of oxides with the chemical formula $R\text{Ba}M_2\text{O}_5$ (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 stoichio-
metric 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 dis-
order. 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 excita-
tions are clearly modified at the charge- and magnetic ordering temperatures: T_{CO}
= 308 K and T_N = 430 K, respectively.

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