

## Mössbauer studies of Fe-doped $\text{HoMnO}_3$

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(Presented on 2 November 2005; published online 24 April 2006)

The crystallographic and magnetic properties of  $\text{HoMn}_{0.99}\text{Fe}_{0.01}\text{O}_3$  powder have been studied by x-ray diffraction, superconducting quantum interference device measurements, and Mössbauer spectroscopy. It has a hexagonal space group  $P6_3cm$  with the lattice constants  $a_0=6.139$  and  $c_0=11.402$  Å at room temperature. The magnetic susceptibility follows a Curie–Weiss law behavior, where the Curie–Weiss temperature was determined to be  $\theta_{\text{CW}}=-18$  K. The Mössbauer spectra below  $T_N=72$  K exhibit the six-line patterns, which coalesce into two lines above  $T_N$ . The electric quadrupole splitting value at  $T_N$  was  $\Delta E_Q=1.79\pm 0.01$  mm/s. An important point can be accessed that the direct observation of a coupling for the electric and magnetic order parameters was possible by Mössbauer spectroscopy. © 2006 American Institute of Physics. [DOI: [10.1063/1.2171054](https://doi.org/10.1063/1.2171054)]