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A second ferroelectric transition induced by pressure in multiferroic GdMn_2O_5 ¹ BERND LORENZ, NARAYAN POUDEL, MELISSA GOOCH, CHING-WU CHU, Texas Center for Superconductivity and Department of Physics, University of Houston, SANG-WOOK CHEONG, Rutgers Center for Emergent Materials and Department of Physics and Astronomy, Rutgers University — In multiferroic materials different magnetic and ferroelectric states compete for the ground state and are usually close in energy. This results in a high sensitivity of the multiferroic state to external perturbations, such as magnetic fields or pressure, which has been demonstrated, e.g. in $\text{Ni}_3\text{V}_2\text{O}_8$, MnWO_4 , and RMn_2O_5 ($R = \text{Tb, Ho, Dy, Y}$). Here we report the results of a high-pressure study of the multiferroic and ferroelectric properties of GdMn_2O_5 , the RMn_2O_5 compound with the highest value of the polarization. The ferroelectric polarization below 29 K is enhanced upon application of pressure. Above a critical pressure, a second ferroelectric transition at even higher temperature is detected through a sizable increase of the polarization and a second peak of the dielectric constant. The ferroelectric polarization at high pressures exhibits two step-like increases upon decreasing temperature.

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