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Temperature-dependent Raman spectroscopy of multiferroic $TbMn_2O_5$[1] J. R. SIMPSON, A. R. HIGHT WALKER, National Institute of Standards and Technology, Gaithersburg, MD 20899, R. VALDES AGUILAR, A. B. SUSHKOV, H. D. DREW, University of Maryland, College Park, MD 20742, S. PARK, S.-W. CHEONG, Rutgers University, Piscataway, NJ 08854 — Multiferroic materials that display coupling between order parameters, *e.g.*, magnetic and dielectric, stimulate fundamental interest and provide the potential for applications in novel multifunctional devices. The multiferroic manganite $TbMn_2O_5$ exhibits non-collinear magnetic order and a strong magnetoelectric coupling effect. The recent observation[2] of infrared (IR) phonon modes correlated with magnetic and dielectric phase transitions suggests a complementary Raman study may provide important information regarding the nature of coupling in these systems. We present Raman measurements of single-crystal $TbMn_2O_5$ in a collinear backscattering configuration as a function of temperature ($4 - 300\,\mathrm{K}$) and polarization along various crystallographic axes. Additionally, we compare the temperature dependence of Raman active phonons with the activation of an IR forbidden mode in the low-temperature ferroelectric state.

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[2]R. Valdés Aguilar *et al.*, Phys. Rev. B **74**, 184404 (2006).

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