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**Ultraviolet Raman spectroscopy of hexagonal $LuFeO_3$ films**[1]
DMITRI A. TENNE, D.A. HILLSBERRY, E.L. THIES, Department of Physics, Boise State University, Boise, ID 83725, USA, J.A. MUNDY, D.A. MULLER, School of Applied and Engineering Physics, Cornell University, Ithaca, NY 14853, USA, C.M. BROOKS, D.G. SCHLOM, Department of Materials Science and Engineering, Cornell University, Ithaca, NY 14853, USA — Hexagonal $LuFeO_3$ films grown by molecular-beam epitaxy on yttria-stabilized zirconia substrates were studied by variable temperature ultraviolet Raman spectroscopy. Hexagonal $LuFeO_3$ is a multiferroic that is isostructural to $YMnO_3$ at room temperature. $LuFeO_3$ spectra at room temperature are consistent with the polar hexagonal $P6_3cm$ structure. The temperature evolution of the Raman spectra of a $LuFeO_3$ film measured in the range 10–1250 K indicate a transition to a non-polar (likely $P6_3/mmc$) phase; fitting of the temperature dependence of the Raman intensities yields a transition temperature of 1020 $\pm$ 50 K. We also observed a change in the slope of Raman intensity vs. temperature dependence of the most intense phonon peak around 400-450 K, which might indicate another structural transition, possibly to a structure with space group $P6_3mc$ (also polar).

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