Abstract Submitted
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Raman and Infrared studies of the multiferroics TbMn2O5 and YMn2O5 SABEUR MANSOURI, SERGE JANDL, Université de Sherbrooke, 2500 Boulevard University, Sherbrooke, Quebec J1K 2R1, Canada, P. ORLITA COLLABORATION[1], M. M. GOSPODINOV COLLABORATION[2] — Orthorhombic manganites of the $RMnO_3$ and RMn_2O_5 families develop an electric polarization induced, flipped and flopped by application of a magnetic field. The $Tb(Y)Mn_2O_5$ Anti-ferromagnetic order is incommensurate between $T_N = 42K$ $(44K)$ and $T_C = 38K$ and becomes commensurate between $T_C = 38K$ and $T = 24K$ $(18K)$; at this temperature ferroelectricicity appears and remains incommensurate below $24K$ $(18K)$[1,2]. We have studied the $TbMn_2O_5$ and YMn_2O_5 Raman active phonons as a function of temperature and compared their behavior to similar multiferroic compounds $Bi(Dy)Mn_2O_5$ phonons where the A_g high frequencies modes soften between $T^* \sim 70K$ and T_N and harden below $T_N \sim 42K$ [3]. The over-hardening of the phonon frequencies above anharmonicity at low temperatures confirm that the spin-lattice interaction plays an important role in the magnetoelectric properties. The $TbMn_2O_5$ infrared active phonon frequencies are also studied as a function of temperature and under applied magnetic field (up to 10 Tesla). As predicted theoretically the $TbMn_2O_5$ infrared-active phonon frequencies soften below T_N. Evolutions of the phonon frequencies under the applied magnetic field are reported and analyzed.

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