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Raman Spectroscopy of Tin Monoxide under High Pressure REUBEN SHUKER, ASAF PESACH, Ben Gurion University, Beer Sheva, Israel, RAMAN LABORATORY TEAM — Under ambient conditions, tin monoxide crystallizes in litharge structure which consists of tetragonal P_4/nmm symmetry. An orthorhombic distortion of this compound at high pressure is assumed to be driven by softening of the unobserved B_{1q} phonon, which results in a spontaneous strain in the xy plane of the tetragonal unit cell. In this case, a reduction of the symmetry into $Pm2_1n$ occurs. The correlation between the tetragonal and orthorhombic symmetries shows a splitting of the degenerated E_g phonon into a superposition of A_1 and B_1 phonons in the lower symmetry. This splitting was observed in our pressure dependent Raman scattering measurements. The changes in the pressure induced Raman spectrum of tin monoxide can be quantitatively obtained by first order perturbation theory. The frequency of this phonon under stress is obtained by diagonalizing the relevant matrix. This procedure gives a frequency shift and splitting of E_q phonon as a function of pressure induced strain. By means of Landau's classical free energy theory this order parameter gives a critical pressure value of 1.03 GPa for the phase transition.

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