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Raman Spectroscopy Study of Phase Transition in Layered Ferroelectric $PbK_2LiNb_5O_{15}$ OLEKSIY SVITELSKIY, Colgate University, Hamilton, NY 13346, YAOVI GAGOU, MIMOUN EL MARSSI, Université de Picardie, Amiens, France — PKLN is a novel material with lattice structure resembling that of tetragonal tungsten bronze. Below 640 K it assumes ferroelectric-ferroelastic orthorhombic phase of Pba2 space group. At high temperature the material is known to possess paraelectric properties characterized by tetragonal P4/mbm structure with one-dimensional electric conductivity. In order to clarify the mechanism of the transition between these two symmetries, we carried out a detailed exploration of temperature dependencies of Raman scattering spectra in five scattering geometries in the broad temperature range between 800 and 300 K, completely covering the region where the phase transformation occurs. Our data indicate that lowering the temperature, pre-transitional phenomena in the form of soft behavior of peaks start at least at 700 K that is well above the transition temperature. While most of the peaks soften towards 640 K, some of them soften towards 680K. Below both of these temperatures many peaks demonstrate splitting. The observed phenomena reveal presence either of an intermediate phase or long-living relaxations in the pretransitional temperature range.

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