

# **Growth and Characteristic Infrared Raman Spectra of Potassium Lithium Niobate Single Crystals**

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Homogeneous and crack-free potassium lithium niobate ( $K_3Li_{2-x}Nb_{5+x}O_{15}$ ,  $0 < x < 0.5$ , KLN) single crystals were successfully grown by the Czochralski technique. The KLN single crystals of several different compositions were employed for the investigation of the lattice vibration spectra using infrared Raman spectroscopy. The characteristic Raman spectra of the  $[NbO_6]^{7-}$  octahedral ions were strikingly influenced by the Li ion content. The symmetric stretch vibrational modes  $V_1$ ,  $V_2$  are broadened, and the symmetric bend vibration mode  $V_5$  is broadened and even split into three peaks with increasing the Li content, supporting that the bend vibration modes of the  $[NbO_6]^{7-}$  octahedrons are obviously perturbed by Li ions in the C site. Enhanced Raman peak intensities after the post annealing at  $900^\circ\text{C}$  and for 24 h evidenced that a residual stress in as-grown crystals was negligible and only a defect concentration might be reduced.