

Optical methods to characterize the composition of potassium lithium niobate crystals

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During recent years, numerous efforts have been dedicated to the search for non-linear optical crystals suitable for second harmonic generation of semiconductor diode laser. Many studies have suggested that potassium lithium niobate (KLN) crystals is one of the promising candidate due to its obvious advantage in high non-linear coefficients, high optical damage threshold and non-critical phase matching characteristic at room temperature. The difficulties, such as cracks and compositional fluctuations in KLN crystal growth still remain for applications. Especially, the control and characterization of composition in single crystals is very important because a number of the physical properties of KLN crystals strongly depend on crystal composition. For comparative study, two kinds of KLN crystals with different crystal composition have been grown by the Czochralski method from different starting compositions. In order to characterize its crystal composition, we observed optical spectra in the UV-VIS and IR region and their electro-optic effects in both crystals. The results prove that the proposed optical methods are very convenient and sensitive method for the characterization of the crystal composition in the KLN crystals as compared to non-optical methods.

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