

Abstract Submitted
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Luminescence and Kinetic Studies of Pr-doped LiNbO₃¹ SHEREEN VELUPILLAI, KATRINA DAUPHINAIS, JOHN COLLINS, YOHANNES TSEHAY, Wheaton College, Norton MA — Lithium Niobate single crystals containing praseodymium (Pr) at nominal concentrations of 1% and 0.2% were studied for their potential use as phosphors for solid-state lighting applications. The interest in this material is due to two reasons: (1) the ability to pump the system efficiently into a charge transfer state, and (2) the fact that the system relaxes directly into the 1D₂ level of Pr, which emits strong red luminescence. We examined the steady state emission and the emission following pulsed excitation from these samples at temperatures between 7K and 500K. The intensity of the emission is steady up to about 250K, and rapidly drops as the temperature is increased. The lifetime of the 1D₂ level shows a similar behavior; it is relatively constant at lower temperatures, and decreases above 250K. These data indicate the presence of thermally activated non-radiative decay path at higher temperatures. The higher doped system also shows evidence of losses due to cross-relaxation energy transfer among the Pr ions.

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