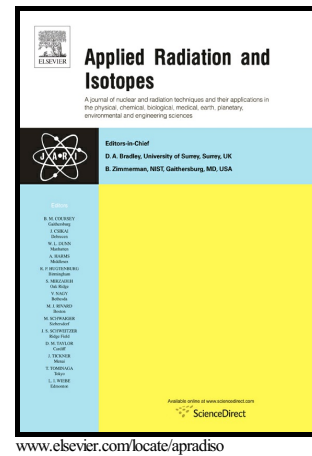


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SYNTHESIS AND THERMOLUMINESCENCE OF ERBIUM-ACTIVATED LITHIUM NIOBATE

I.C. Muñoz^{a,*}, M. A. Landavazo^b, F. Brown^{b,*}, E. Cruz-Zaragoza^c, V. E. Alvarez-Montañó^b, R. Meléndrez-Amavizca^d, I. Gil-Tolano^d, J. Tánori-Córdova^b.

^aDepartamento de Ciencias Químico-Biológicas, Universidad de Sonora, A.P.106, Hermosillo, Sonora, C.P. 83000, México.

^bDepartamento de Investigación en Polímeros y Materiales, Universidad de Sonora, A.P.106, Hermosillo, Sonora, C.P. 83000, México.

^cInstituto de Ciencias Nucleares, Universidad Nacional Autónoma de México, A.P.70-543, México D.F. 04510, México.

^dDepartamento de Investigación en Física, Universidad de Sonora, A.P.106, Hermosillo, Sonora, C.P. 83000, México.

Abstract

Erbium-activated lithium niobate; 1, 2, and 4 mol% (LN-1, LN-2 and LN-4 respectively) were synthesized by solid-state method and their thermoluminescent (TL) properties were analyzed. The glow curve of LN-4 showed a maximum at 177 °C and its linear dose-response interval ranged from 50 to 350 Gy. Its TL intensity was two orders of magnitude greater compared to those of pure lithium niobate (LN), LN-1 and LN-2. We conclude that LN-4 is an interesting material for TL dosimetry applications.

1. Introduction

Because of the versatile engineering applications of lithium niobate (LN), attention has been focused on this compound (Tumuluri and Raju, 2014). It is a ferroelectric crystal that exhibits a considerable birefringent, pyroelectric, piezoelectric, electro-optic, elastic, photo-elastic, and bulk photovoltaic effects (Baumann et al., 1996; Lin et al., 2008; Weis and Gaylord, 1985). It is also an attractive material for nonlinear and integrated optics due to these optical and physical properties (Fadil et al., 2011). LN is a human-made dielectric material that was synthesized in single-crystal form and investigated in detail at Bell Laboratories (Weis and Gaylord, 1985). Since then, other methods have been developed for synthesis of LN powder, such as by water-soluble complexes, combustion synthesis (Liu et

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