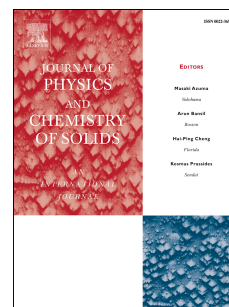


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HIGH THERMAL STABILITY OF $\text{Li}_2\text{TiO}_3\text{-Al}_2\text{O}_3$ COMPOSITE IN THE MICROWAVE C-BAND

V. C. MARTINS^{1,3}, R. G. M. OLIVEIRA^{2,3}, F. F. CARMO^{1,3}, M. A. S. SILVA³, S. A. PEREIRA¹, J. C. GOES³, M. M. COSTA⁵, D.X. GOUVEIA⁴, A. S. B. SOMBRA^{2,3,6}

¹ Organic and Inorganic Chemistry Department, Federal University of Ceará, UFC, 60455-760 Fortaleza, CE, Brazil

² Telecommunication Engineering Department, Federal University of Ceará (UFC), P.O. Box 6007, Fortaleza, Ceará 60755-640, Brazil

³ Physics Department – Telecommunication, Materials Science and Engineering of Laboratory (LOCEM), P.O. Box 6030, Fortaleza, Ceará 60455-760, Brazil

⁴ Federal Institute of Ceará (IFCE), Fortaleza, CE, Brazil

⁵ Institute of Physics, LACANM, UFMT, 78060-900 Cuiabá, MT, Brazil

⁶ Laboratorio de Redes de Comunicação e Segurança (LARCES), Universidade Estadual do Ceará, Campus do Itaperi, Av. Paranjana 1700, Fortaleza, Ceará 60755-640, Brazil

Abstract

In this study, we analyzed composites based on $\text{Li}_2\text{TiO}_3\text{-Al}_2\text{O}_3$ in the microwave range by measuring their dielectric properties comprising the temperature coefficient of the resonant frequency (τ_f), relative dielectric permittivity (ϵ_r), and dielectric loss ($\tan\delta$) in the C band (4–8 GHz). The Li_2TiO_3 phase was obtained by solid-state reaction and the ceramic composites were obtained by blending phase 2 with 5, 10, 15 and 20 wt% of Al_2O_3 . We then analyzed these ceramic composites as dielectric resonator antenna. The results showed that the alumina addition of 5 wt% improved the τ_f value for the composites ($\tau_f = -0.58 \text{ ppm } ^\circ\text{C}^{-1}$) but the other dielectric properties did not improve with the alumina concentration, where the permittivity decreased and the dielectric loss increased. According to the antenna measurements, all of the samples exhibited good performance in terms of the gain (3.91–5.67 dBi), bandwidth (338–500 MHz), and efficiency (70.58–96.84 %) compared with previous findings.

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