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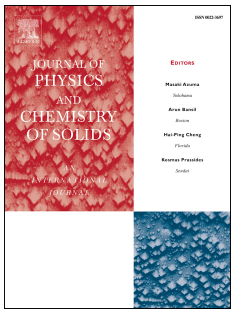

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HIGH THERMAL STABILITY OF Li_2TiO_3-Al_2O_3 COMPOSITE IN THE MICROWAVE C-BAND

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Abstract

In this study, we analyzed composites based on Li_2TiO_3-Al_2O_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 (tanδ) 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 (τ_f = –0.58 ppm $°C^{-1}$) 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.