Study and Application ZnO-doped Nd(Co1/2Ti1/2)O3 Microwave of Dielectric Materials

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ABSTRACT

The dielectric properties and microstructures of Nd(Co1/2Ti1/2)O3 (NCT) ceramics with ZnO additions (0.5?2 wt?) prepared with a conventional solid-state route have been investigated. It is found that the sintering temperature for Nd(Co1/2Ti1/2)O3 ceramics can be reduced due to ZnO additions. At 1350oC, Nd(Co1/2Ti1/2)O3 ceramics with 0.5 wt% ZnO addition possess a dielectric constant (?r) of 27.4, a Q?f value of 147000 (9 GHz) and a temperature coefficient of resonant frequency (?f) of – 30 ppm/oC. Miniaturized microstrip line hairpin resonator with interdigital capacitor on the high permittivity ceramic substrates was implemented. The full-wave simulator IE3D is used to design the two kinds of filter, one is two-pole electric coupling bandpass filter, and the other is four-pole cross coupling bandpass filter. The responses of filters which were designed at a frequency of 2.4GHz with using ZnO-doped NCT ceramic substrates are f0 = 2.36GHz、FBW = 4.6 %, S11 = -18.7 dB, S21 = -3.4 dB of four-pole cross-coupled bandpass filter, and f0 = 2.43GHz、FBW = 7.5%, S11 = -31.63dB, S21 = -1.71dB of two-pole electric coupled bandpass filter.

Keywords : Nd(Co1/2Ti1/2)O3, bandpass filter

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