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

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 1350°C, Nd(Co1/2Ti1/2)O3 ceramics with 0.5 wt% ZnO addition possess a dielectric constant ($\varepsilon_r$) of 27.4, a $Q\cdot f$ 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 $f_0 = 2.36GHz$、$FBW = 4.6\%$, $S_{11} = -18.7\, \text{dB}$, $S_{21} = -3.4\, \text{dB}$ of four-pole cross-coupled bandpass filter, and $f_0 = 2.43GHz$、$FBW = 7.5\%$、$S_{11} = -31.63\, \text{dB}$, $S_{21} = -1.71\, \text{dB}$ of two-pole electric coupled bandpass filter.

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

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