

The Sintering and Microwave Dielectric Characteristics of MgTa_{1.5}Nb_{0.5}O₆ Ceramics

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MgTa_{1.5}Nb_{0.5}O₆ ceramics were combined from two microwave dielectrics with high Q×f values and high τ_f values, MgTa₂O₆ (sintered at 1500°C, ε_r=30.5, Q×f=56900 GHz, and τ_f=28.3 ppm/°C) and MgNb₂O₆ (sintered at 1300°C, ε_r=21.7, Q×f=89900 GHz, and τ_f=-68.5 ppm/°C) MgNb₂O₆, in order to obtain microwave dielectric resonators with τ_f value close to 0 ppm/°C. The sintering and microwave dielectric characteristics of MgTa_{1.5}Nb_{0.5}O₆ ceramics were investigated in this study. As the sintering temperature increased from 1300°C~1450°C, the density values, the ε_r values, and the Q×f values of MgTa_{1.5}Nb_{0.5}O₆ ceramics increased and saturated at 1450°C, and τ_f values were shifted to close 0 ppm/°C. The 1450°C-sintered MgTa_{1.5}Nb_{0.5}O₆ ceramics had the microwave dielectric characteristics of ε_r=27.9, Q×f=33100 GHz, and τ_f=-0.7 ppm/°C.

KEYWORDS: MgTa_{1.5}Nb_{0.5}O₆, microwave dielectric characteristic, sintering temperature