

Alkaline-Earth Doping in (K,Na)NbO₃ Based Piezoceramics

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Abstract: In this contribution the effect of alkaline-earth (AE) dopants Mg²⁺, Ca²⁺, Sr²⁺ and Ba²⁺ on sinterability and functional response of KNN is studied. Ceramic powders with the general formula (K_{0.5}Na_{0.5})_{1-2y}AE_yNbO₃, y = 0.005 were prepared by classical ceramic processing. The values of 94 - 95 % of theoretical density (TD) are obtained for stoichiometric KNN after sintering at 1115 °C for 2 hours. Calcium and strontium doping promotes densification while magnesium doping inhibits it. In the case of Ba-doping a secondary phase forms.

The dielectric constant and piezo d₃₃ coefficient determined by Berlincourt piezo d₃₃-meter of Ca and Sr-doped KNN ceramics are 500 and 95 pC/N, respectively, while the values for undoped KNN are slightly lower.