

ABSTRACT

FERROELECTRIC CERAMIC MATERIAL WITH A LOW SINTERING TEMPERATURE

5 The present invention provides new ferroelectric ceramic materials which can be sintered at a temperature lower than that of the conventional ferroelectric ceramic materials and upon sintering, devices formed of the new ferroelectric ceramic materials possesses excellent piezoelectric properties which are suitable for many industrial applications. The ferroelectric ceramic material includes a composition with a general formula of $w\text{Pb}(\text{Ni}_{1/3}\text{Nb}_{2/3})\text{O}_3 - x\text{Pb}(\text{Zn}_{1/3}\text{Nb}_{2/3})\text{O}_3 - y\text{Pb}(\text{Mg}_{1/3}\text{Nb}_{2/3})\text{O}_3 - z\text{PbZrO}_3 - (1-w-x-y-z)\text{PbTiO}_3$, in which $0 < w < 1$, $0 < x < 1$, $0 \leq y < 1$, $0 < z < 1$, $w+x+y+z < 1$, and $0.5 \leq w+x+y$. A method of preparing a ferroelectric ceramic material includes preparing MgNb_2O_6 , ZnNb_2O_6 and NiNb_2O_6 powder precursors, mixing the precursors with PbO , TiO_2 and ZrO_2 to form a mixture and calcining the mixture.

(Figure 1A)