

ABSTRACT

HETEROLAYERED FERROELECTRIC THIN FILMS AND METHODS OF FORMING SAME

Heterolayered thin films having ferroelectric/piezoelectric layers of alternating crystal structures and methods of their preparation are provided. In the ferroelectric/piezoelectric thin film, a first layer has a rhombohedral crystal structure and a second layer adjacent the first layer has a tetragonal crystal structure. The layers have a (100) preferred orientation with a-axis normal to the surface of the film. The first layer can be a Zr-rich lead zirconate titanate layer (e.g., $\text{PbZr}_{0.6}\text{Ti}_{0.4}\text{O}_3$) and the second layer can be a Ti-rich PZT layer (e.g., $\text{PbZr}_{0.2}\text{Ti}_{0.8}\text{O}_3$). Heterolayered ferroelectric/piezoelectric thin film comprising a plurality of such first and second layers in alternating sequence exhibits particularly improved electrical properties.

Figure 1