

ABSTRACT

A solid solution of ferroelectric PbTiO_3 and anti-ferroelectric PbZrO_3 , Lead zirconate titanate, $\text{Pb}(\text{ZrTi})\text{O}_3$ (PZT) has a perovskite structure. Because of ease in tailoring the properties of PZT for various applications, it has been studied extensively since last few decades. Modifications in PZT can be done in various ways i.e. by substitution of mono or multi valent dopants either at A or B sites, in various physical forms. Therefore to understand PZT from different angle, a modification by manganese (Mn) (transition element) by replacing titanium in PZT for different ratios, has been carried out in present work. Three ratios 65/35, 52/48, 35/65 of zirconium and titanium were chosen. And Mn was used in different concentrations of 0.02, 0.06 and 0.10%. Preliminary structural studies revealed that the ratios 65/35, 52/48, 35/65 have orthorhombic, mixed phase (orthorhombic + tetragonal), and tetragonal crystal structure respectively with spherical grains, uniformly distributed across the sample surface. All the compounds show diffused phase transition with very little spread of their transition temperatures. Complex Impedance spectroscopy shows that in almost all the cases the conduction is mainly due grains.

Key Words: Lead zirconate titanate, Ratios, Manganese, Perovskite, Ferroelectric, Diffused phase transition.