



Synthesis and structural analysis of Barium Samarium Zirconium Titanate (BSZT)

• Riekhshika Sanwari • Shrinkhala • Ruchi Jha
• Surabhi Prasad

Received : November 2013

Accepted : March 2014

Corresponding Author : Surabhi Prasad

Abstract : Barium Samarium Zirconium Titanate (BSZT) was synthesized by doping samarium on the A sites of barium zirconium titanate (BZT). BSZT was prepared by dry route method. For BSZT raw materials were taken in stoichiometric proportion and placed in ball mill for 72 hrs for homogeneous mixing and then calcinations was done at 1300°C. Lumps were then grinded and XRD of the calcinated powder were done. Pellets were made and sintered at 1350°C. Poling and Electroding was done for characterization. Poling and electroding are required to form the capacitor. The diffraction peaks of the samples were shifted to the higher angle side with the increase of samarium doped concentration.

Key Words : XRD, Doping, Sintering, calcinations, poling.

Riekhshika Sanwari

B.Sc. II year, Physics (Hons.),

Session : 2012-2015, Patna Women's College,
Patna University, Patna, Bihar, India

Shrinkhala

B.Sc. II year, Physics (Hons.),

Session : 2012-2015, Patna Women's College,
Patna University, Patna, Bihar, India

Ruchi Jha

B.Sc. II year, Physics (Hons.),

Session : 2012-2015, Patna Women's College,
Patna University, Patna, Bihar, India

Surabhi Prasad

Head, Deptt. of Physics, Patna Women's College,
Bailey Road, Patna – 800 001, Bihar, India.

E-mail : surabhi_prasad2000@yahoo.co.in

Introduction :

Ferro electricity is a property of certain materials which has spontaneous polarization that can be reversed by the application of an external electric field. It has also been called seignette electricity, as seignette or Rochelle salt was the first material found to show ferroelectric property such as spontaneous polarization on cooling below curie temperature, ferroelectric domains & ferroelectric hysteresis loops (Dekker 2010).

Due to environmental concerns, there has been growing interest in the use of lead free ceramics such as Barium Titanate (BT) and BZT in applications such as sensors and actuators. Barium Titanate ($BaTiO_3$) is an electric insulator in pure form. Barium Titanate has a paraelectric phase above its curie point (T_c) of about 120°C. At T_c it undergoes phase change from tetrahedral to cubic. Barium titanate as a powder white to grey in colour has a perovskite structure. It is insoluble in acid like H_2SO_4 , HCL, and HF and soluble in alkali and water. It can be manufactured by liquid phase sintering of barium carbonate and titanate dioxide optionally with other materials for doping. (Haertling 1999).