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# Synthesis and characterization of $BaSnO_3$ and $Ba_{0.90}M_{0.10}SnO_3$ (M = La, Y, and Gd)

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$BaSnO_3$ belongs to the family of alkaline-earth stannate ($MSnO_3$) which is an n-type semiconducting material [1]. It has been widely investigate on its dielectric, thermal photocatalytic and as a good candidate for gas sensor.

The undoped $BaSnO_3$ (BS) and doped $Ba_{0.90}M_{0.10}SnO_3$ (M= La, Y, and Gd) (BSL, BSY, BSG) were prepared using solution combustion method.

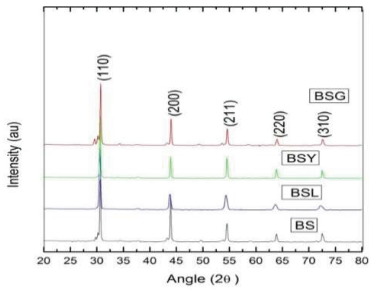


Figure 1: X-Ray diffraction pattern of $BaSnO_3$ and $Ba_{0.90}M_{0.10}SnO_3$ (M:L, Y. Gd)

The Phase evolution of synthesized samples at different temperatures was studied using x-ray diffraction technique. The XRD pattern of samples sintered at $1300^0$C are shown in Figure [1], which confirms the formation of single phase of materials, and the peaks are shifted towards the higher angle as the radii of dopants are increase. The crystal structure of synthesized powders were cubic similar to their parent structure $BaSnO_3$, and lattice parameter is dependent of ionic radii of different dopants (Y, La, Gd) [2].

The functional characterizations of synthesized powders were made using Fourier Transformation of Infrared (FTIR) technique as shown in Figure [2]. This shows that as the radii of dopant increases the transmittance peak is Red is shifted towards the higher wavelength.

The electrical measurements of the powders were pelletized and sintered at 1300 $^o$C in air atmosphere for 12 hrs. The ac conductivity of the pellets were measured in temperature range (30-$550^0$C) and frequency range 10Hz-1 MHz using L-C-R meter as shown in Figure 3 [2]. The influences of dopants on the electrical properties were also studied.

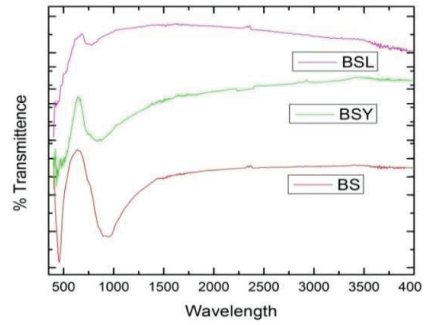


Figure 2: FTIR of BaSnO3 and $Ba_{0.90}M_{0.10}SnO_3$ (M: L, Y.)

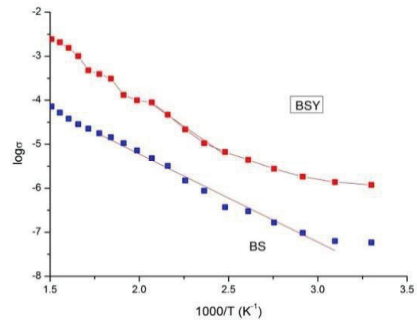


Figure 3: Variation of conductivity Vs 1000/T ($K^{-1}$) $Ba_{0.90}M_{0.10}SnO_3$(M: Y)

## References

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2] Yanzhong Wang, Anthony Chesnaud, Emile Bevillon, Jinlong Yang Guilhem Dezanneau, international journal of hydrogen energy 36 (2011)7688-769