

## Structure, Optical and Dielectric Studies of PZT-Based Thin Films

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### Abstract

Electroceramic  $\text{Pb}_{0.97}(\text{Zr}_{0.52}\text{Ti}_{0.46})\text{O}_3$  thin films doped with Ba, Ca, Sr have been grown by RF magnetron sputtering on stainless steel, MgO and Si substrates. Processing conditions for the preparation of thin films were optimised to assure the composition transfer between the target and the thin films. The obtained samples were analysed first as made (deposition of thin films at temperature up to 5000C) and then after post deposition annealing in air atmosphere (at temperatures 600 - 6500C) by X-ray diffraction method. The room temperature Raman spectra were obtained and investigated using 514 nm line in the range of wave number  $k=25\text{-}1500$  1/cm. The temperature evolution of dielectric properties (i.e., dielectric permittivity and dielectric loss tangent) has been investigated by the bridge technique. The impedance spectroscopy analysis in the frequency window 10106Hz has been performed. A simplified electrical equivalent circuit representing contribution of electrode interfaces, the grain boundaries and the bulk of the grains of the electroceramic thin film was applied to analyse the obtained impedance spectra. The study of processing structure property relationships has been performed and the results are presented. Acknowledgements: A. Khodorov thanks FCT (grant SFRH/BPD/11675/2002) for financial support.