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Iron Doped Ba0,6 Sr0,4 Ti1-x Fex O3 Thin Films Deposited by RF Magnetron Co-sputtering

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Barium strontium titanate (BST) is a very promising material for tunable microwave applications like phase-shifters and tuneable filters. Due to this the influence of e.g. annealing conditions and processes on thin film properties were largely investigated. The properties of some iron doped thin films [1] and powders [2], with different Ba/Sr concentrations prepared by sol-gel method, are also known. But very few researchers have tried to change the sputtered BST thin film properties by using different dopants. Such iron doped thin films can be achieved by RF magnetron sputtering, with a co-sputter target and by optimising the stoichiometry defining parameters. The crystallinity of the thin films is attained by different annealing processes after deposition.
The present contribution focuses on the processing of the BST thin films with various amounts of iron doping by the use of RF magnetron co-sputtering. The characterization of the thin films by X-ray photoelectron spectroscopy (XPS) provides chemical binding states and film composition. XPS sputter depth profiles ensure the chemical homogeneity and combined with ellipsometry measurements the film thickness. Grazing incident X-ray diffraction (XRD) validates the crystallinity and the identification of chemical phases. Furthermore film morphology is determined by scanning electron microscopy (SEM).
[1] Y. Ye, T. Guo, Ceramics International, 2009, 35, 2761-2765.
[2] F. Paul, J.-R Binder, H. Gesswein, H.-J. Ritzhaupt-Kleissl, J. Hausselt, Ceramics International, 2009, 35, 479-486.

Keywords
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