Studies of physical properties in BiFeO3 thin films

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ABSTRACT

BiFeO3(BFO) thin films were grown by radio frequency(RF) magnetron sputter deposition on a (111) SrTiO3(STO) substrate., These films were grown with Fe:Bi ratio =1:1.02 of target,, and at different argon environmental pressures and different growth time to grow, the growth of pressure used in the experiments were 20 × 10-2 torr. and 60 × 10-2 torr., the substrate temperature of 600 ℃ under the growth of this film. By X-ray diffraction for analysis, observed perpendicular to the films surface of the X-ray diffraction, showing the BFO thin film of STO (111) epitaxial properties , BFO lattice parameter matching (111) peak, the diffraction peak of the angle is 40 ° , the growth of the BFO film with time will affect the structure, the growth in the relatively long time under the BFO thin film structure will be more obvious, the film growth will significantly affect the pressure structural phase BFO with the mixed phase (Bi25FeO40 , Bi2Fe4O9), the growth in the low pressure of the growth of the BFO film with the structure will be better, and also in the mixed phase is relatively good improvement on the film surface analysis using atomic force microscope (AFM) and scanning electron microscopy (SEM) to do measurements, we found that crystallization and surface roughness at a relatively low under the pressure of growth are more favorable, and in the electrical aspects of the I-V curves show only films with Ohmic nature of the relationship, the other part of the activation energy of the film in a relatively high growth under the pressure of a relatively high activation energy. Keywords: magnetron sputter, epitaxial, atomic force (AFM), scanning electron microscope (SEM)

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