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Influence of Growth Rate on the Microstructure and Magnetic Properties of CoFeHfO Thin Films

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Nanocrystallines CoFe in the thin film CoFeHfO is fabricated by pulsed RF magnetron reactive co-sputtering technique. Particular attention was given to the influence of the growth rate on the microstructure and magnetic properties of thin films. The growth rate is controlled by the power sputtering (P) at the same other conditions. The X-ray diffraction (XRD), high resolution transmission electron microscopy (TEM) and atomic force microscopy (AFM) are used to analyze microstructure of thin films. The result shows that formation of crystallizes and grain size CoFe are depended due to growth rate because of difference of growth rate and affinity of each materials. Additional, roughness of surface increased quickly with increase of growth rate and it is reason of increasing coercivity and decreasing anisotropy magnetic. The optimal results indicate that the best quality of microstructure of thin films which give out the best magnetic properties were prepared when sputtering power of 300W, pressure of 2mmTorr, corresponding with growth rate was 100nm per 1min.

REFERENCES

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SE04

Effect of Thickness on The Microstructure and Soft Magnetic Properties of CoFeHfO Thin Films

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The thickness effects on the soft magnetic properties of thin films CoFeHfO have been investigated in the range of 100-600nm. The coercivity (H_c) and the anisotropy (H_k) are changed strongly with increase of film thickness, but the saturation induction and the resistivity almost remained unchanged. H_c and H_k are reached in minimum of 0.18 Oe and maximum of 50 Oe, respectively at 200 nm of film thickness. The high saturation magnetic induction is 21 kG and resistivity is 500 $\mu\Omega\text{cm}$. It is significant to say that these are the excellent magnetic properties of the thin films.

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