

Enhanced effect of magnetic anisotropy on patterned Fe-Al-O thin films

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As a result of the recent miniaturization and enhancement in the performance of thin film inductors and thin film transformers, there are increased demands for the thin films with a high magnetic permeability in the high frequency range, a high saturation magnetization, a high electrical resistivity, and a low coercive force[1-2]. In order to improve high frequency properties, we will investigate anisotropy field by shape and size of pattern. The Fe-Al-O thin films of 16mm diameter and 1 μ m thickness were deposited on Si wafer, using RF magnetron reactive sputtering technique with the mixture of argon and oxygen gases. The fabricating conditions are obtained in the working partial pressure of 2mTorr, O₂ partial pressure of 5%, input power of 400W, and Al pellets on an Fe disk with purity of 99.9%. For continuous thin film is the 4Ms of 19.4kG, H_c of 0.6Oe, H_k of 6.0Oe and effective permeability of 2500 up to 100MHz. In this work, we expect to enhanced effect of magnetic anisotropy on patterned of Fe-Al-O thin films.

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[2] P.J.H.Bloemen, B.Rulkens, *J.Appl.Phys.* 84(1998)677