

CONTROL OF MAGNETIC ANISOTROPY IN PATTERNED FeTaN FILMS FOR HIGH-FREQUENCY APPLICATION

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FeTaN films have been widely investigated due to their high saturation magnetization and good soft magnetic properties.[1-4] Achievement of good high frequency characteristic of soft magnetic film is of importance for high frequency applications such as mobile communication devices. Since the high frequency characteristics of thin soft magnetic films (less than 500 nm in thickness) is known to be limited by ferromagnetic resonance loss rather than by eddy current loss, high anisotropy field is an important factor for high frequency applications. In this study, as a means of enhancing anisotropy field through shape anisotropy, strip-patterned FeTaN films were investigated.

FeTaN films were lithographically patterned as a strip shape using lift-off processes. Anisotropy field (H_k) is increased by increasing shape factor, while saturation magnetization ($4\pi M_s$) is slightly decreased accordingly. To investigate the high frequency characteristics of patterned FeTaN films, we measured the permeabilities of FeTaN films with H_k of 40 as a function of frequency. The film shows stable frequency dependency up to 1 GHz. The possible mechanism of high frequency degradation of FeTaN films will be also discussed.

References

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