

Abstract Submitted
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High frequency magnetic properties of FeCoSiB thin films¹ RAVI HADIMANI, Department of Electrical and Computer Engineering, Iowa State University, MANGUI HAN, State Key Laboratory of Electronic Thin Films & Integrated Devices, University of Electronic Science & Technology of China, DAVID JILES, Department of Electrical and Computer Engineering, Iowa State University, MAGNETICS RESEARCH GROUP TEAM, PROF. HAN TEAM — Currently, high frequency properties of magnetic materials are critical for the performances of many mobile electronic devices. Larger permeability can be obtained in ferromagnetic thin films that are suitable for high frequency applications. We report the high frequency properties of FeCoSiB thin films with different treatments and with different structures (single layer or FeCoBSi/SiO₂ multilayer). For instance, we have studied the annealing effects on the microwave permeability values. It is found that the as-prepared films and films annealed at 300 °C for 1 hour are found in amorphous states and to be anisotropic in static magnetic properties. Nanocrystalline grains have been found in the films annealed at 400 °C for 1 hour, which are isotropic in magnetic properties. With increasing the annealing temperature, the coercivity and saturation magnetic fields are found decreasing. The resonance frequency shows the same varying trend as the saturation magnetic fields. Very large microwave magnetic losses have been found in all the films, which indicate that FeCoSiB films have potential applications in microwave noise attenuation.

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Ravi Hadimani
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