

Fabrication and characteristic of nitrogen -doped NiFe free layer for enhanced magnetic tunnel junction devices

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Nitrogen-doped NiFe films were deposited on thermally oxidized Si substrates in an Ar and N₂ gas mixture by using a dc magnetron sputtering system with a base pressure of 10⁻⁸ Torr. The structural properties of samples were determined by X-ray diffraction using Cu K α radiation and Atomic force microscope, and the magnetic properties were measured by a vibrating sample magnetometer and Magnetic force microscope at room temperature. The dependence of the structural and magnetic properties on various nitrogen partial pressure, DC Power and post-thermal treatment were systematically studied. Basic properties of these films, such as amorphous, nano crystal and low Ms, were intentionally controlled by various deposition condition.