

GIANT MAGNETORESISTIVE (GMR) SPIN-VALVE STRUCTURES,

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Giant Magneto Resistive (GMR) heads are employed to precisely read magnetically written information on the medium by a thin film inductive write head. GMR sensors are stacks of magnetic and non-magnetic thin film layers with a total thickness of approximately less than 50nm. The large change observed in the total resistances of the stack in the presence of magnetic field is called the GMR effect. The main parameter used to quantify a GMR spin-valve is the MR ratio defined as $\Delta R/R$. The higher the MR ratio the higher the sensitivity of the stack for small external field. Successful fabrication of GMR Spin-Valve test structures has been realized in collaboration with Veeco/CVC. Various multilayer spin-valve structures such as synthetic metal spin-valve, bottom nano oxide layer (BNOL) spin-valve, top nano oxide layer (TNOL) spin-valve and surfactant spin-valve structures were deposited utilizing Veeco's UHV Nexus PVD-10 Target Planetary system. The structures were designed using Mentor Graphics CAD tool and photo masks were fabricated using Perkin Elmer MEBES III electron beam writer. A photolithographic process consisting of etch and lift-off steps has been developed to define the dimensions of the spin valve read head. Electrical and magnetic properties of sheet film stacks and patterned devices are tested and compared.