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Magnetic properties of ion-etched magnetic nanodot arrays IOAN TUDOSA, KEITH CHAN, ERIK SHIPTON, ERIC FULLERTON, University of California San Diego — One pathway for increasing the density in magnetic recording media is to have bits stored as single patterned magnetic islands. While promising, this method has been hindered by the failure to reduce the island to island variation of magnetic switching properties. We have prepared [Co/Pd], [Co/Pd]Co/Ni and CoO/[Co/Pd]/CoO multilayers to tune the anisotropy. The films were subsequently patterned into nanodot arrays by ion etching using self organized di-block copolymers as the etch mask. The resulting patterned islands have a 32-nm diameter and 65-nm pitch. We characterize the time and temperature dependence of the magnetic properties to extract the coercivity, switching field distribution and thermal stability parameters. The distribution of the switching fields, in the range of 10-12% of the coercive field, was separated into intrinsic and dipolar contributions and find small dipolar contribution to the switching field distributions. The room temperature stability parameters are greater than 100 k_BT for all the samples. However, the magnetic switching volume extracted from the thermal stability is significantly less than the physical volume of the samples suggesting incoherent reversal. We will discuss the physical origin of the incoherent reversal.

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