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Magnetic Properties of arrays of nanostructured antidots obtained by self-assembling polystyrene nanosphere lithography

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Nanosphere lithography, exploiting self assembling properties of colloidal solutions of water monodispersed polystyrene nanospheres (PN), recently comes out as an emerging technique for thin films nanostructuring. Antidotted magnetic structures were produced using monolayers of PN as a mask for sputter deposition of Co and FINEMET. Subsequently, the PN particles were removed in an ultrasonic bath. Samples microstructure was studied by SEM and AFM microscopy (magnetic particles mean size ~ 400 nm). Room-temperature hysteresis loops were measured by an AGFM (parallel and perpendicular configuration). MFM and high-resolution Kerr microscopy were exploited to study the magnetic domain pattern. The latter allowed us to study the magnetic response as a function of the lattice orientation. Hysteresis loops revealed a parallel and a perpendicular component of magnetization, which could be attributed to different features of the domain configuration.