Magnetic switching behavior of granular FePt(BN, Ag, C) films

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The microstructure and magnetic switching behavior of FePt(BN, Ag, C) granular thin films deposited on an MgTiON intermediate-layer with and without an ultrathin MoC inserted-layer are discussed. A CrRu seed layer with a (002) texture was first grown on a glass substrate to induce the formation of a (002) textured MgTiON intermediate-layer. FePt granular thin films with 10 vol% of (BN,Ag,C) were finally deposited on the MgTiON layer at 450^{o}C by co-sputtering. The FePt(BN, Ag, C) films directly deposited on the MgTiON intermediate-layer show perpendicular anisotropy and an out-of-plane coercivity as high as 15.8 kOe (Fig. 1(a)). The FePt films consist of squared- and rectangular-islands with an average contact angle of around 90^{o} (Fig. 1(c)). When a 3nm thick MoC layer is added, the change of the surface/interface energy induces the formation of trapezoidal FePt islands with small contact angle of around 47^{o} (Fig. 1(d)). The FePt films still show perpendicular anisotropy and an out-of plane coercivity as large as 8.27 kOe (Fig.1(b)). The lower coercivity is due to the second nucleated disordered FePt grains which deteriorate the FePt [001] orientation. To carefully investigate the magnetization switching behavior of FePt(BN, Ag, C), the angular dependence of remanent coercivity was also investigated.

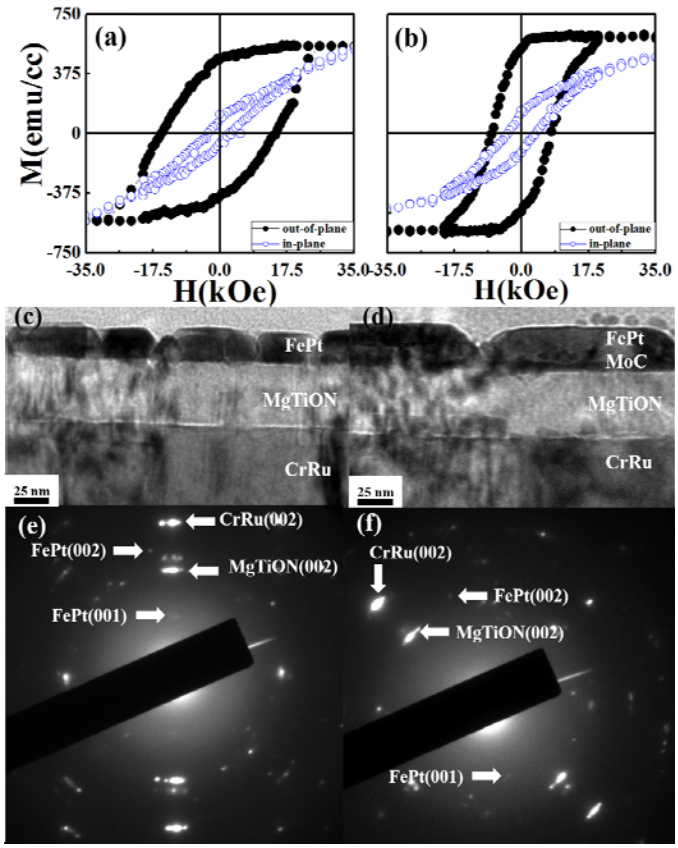

Figure 1 Magnetic hysteresis loops of (a) FePt(BN, Ag, C)/MgTiON film, (b) FePt(BN, Ag, C)/MoC/ MgTiON film and TEM images of (c) FePt(BN, Ag, C)/MgTiON film, (d) FePt(BN, Ag, C)/MoC/ MgTiON film, (e) selected area diffraction pattern of (c), (f) selected area diffraction pattern of (d)