Supplementary information

Controlling the magnetic properties of polymer-iron oxide nanoparticle composite thin films via spatial particle orientation

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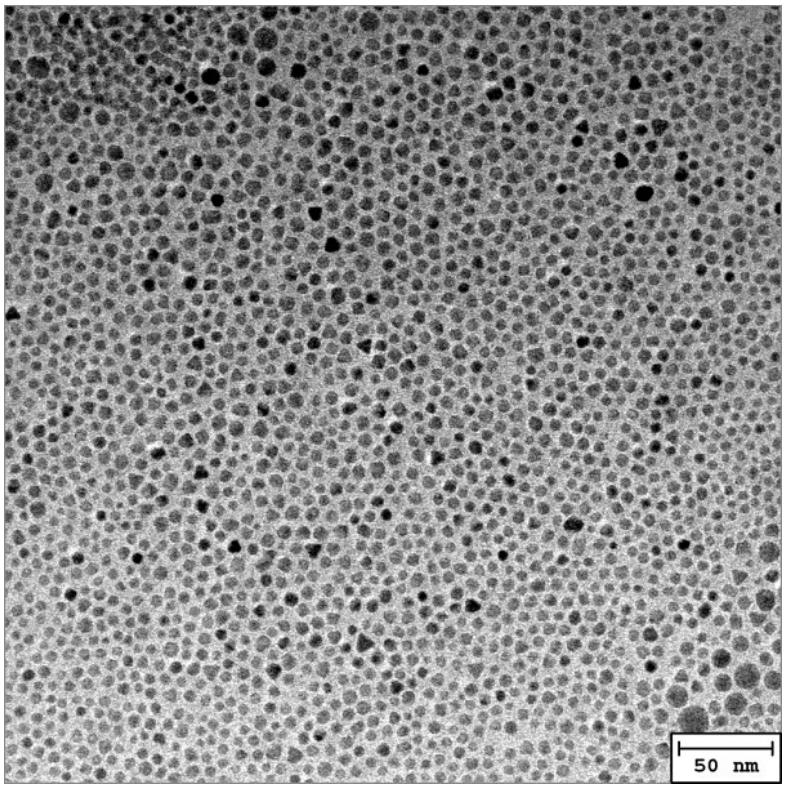


Fig. S1. TEM images of an Fe_3O_4 nanoparticle LB monolayer after compression at the surface pressure of 20 mN/m, measured at the different area.

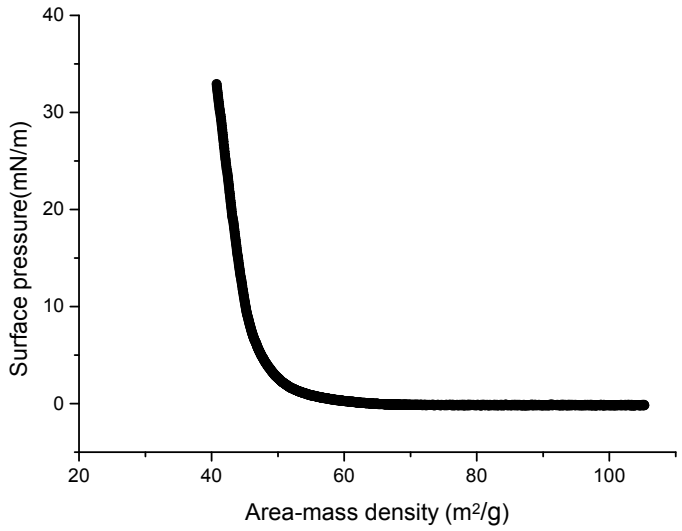


Fig. S2: Surface pressure – area isotherm recoded for Fe_3O_4 nanoparticles at the air-water interface and pH 7.4 and 20 ^oC.

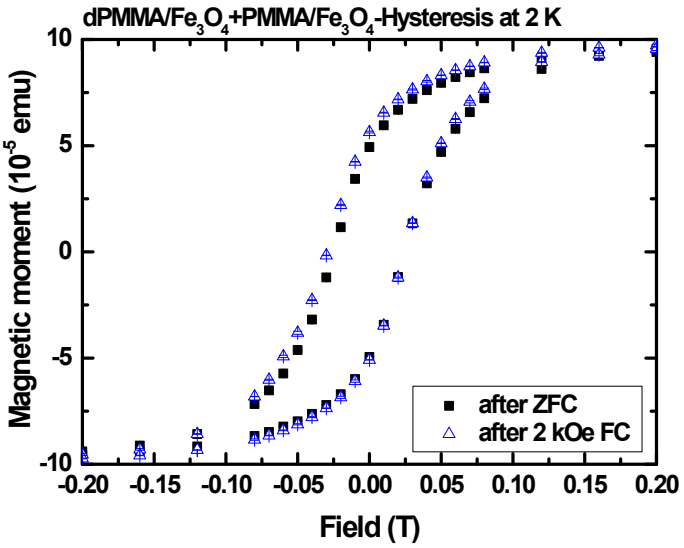
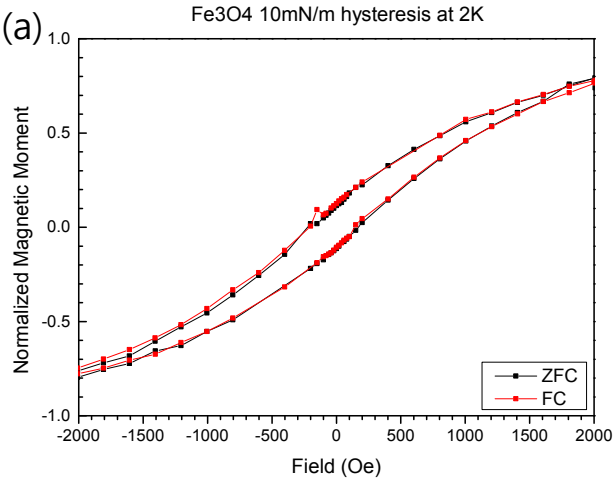
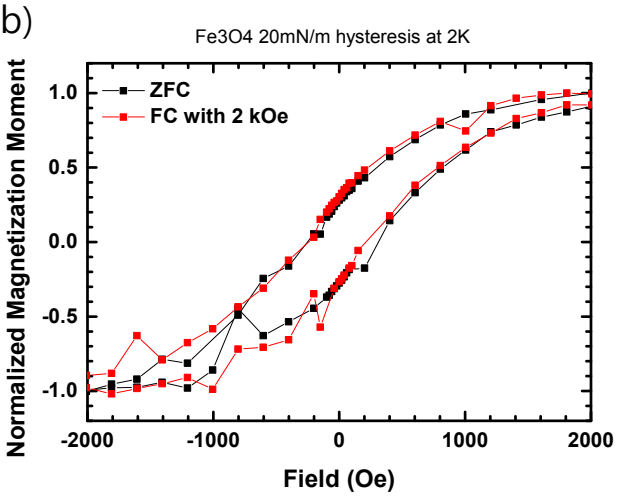


Fig. S3. Magnetization versus applied magnetic field H for the Fe_3O_4 nanoparticle–PMMA multilayer at 2 and 300 K after zero field cooling (ZFC) and 2 kOe field cooling (FC).

(a)


Fe3O4 10mN/m hysteresis at 2K
Normalized Magnetic Moment
1.0
0.5
0.0
-0.5
-1.0
-2000
-1500
-1000
-500
0
500
1000
1500
2000
Field (Oe)
ZFC
FC

(b)


Fe3O4 20mN/m hysteresis at 2K
Normalized Magnetization Moment
1.0
0.5
0.0
-0.5
-1.0
-2000
-1000
0
1000
2000
Field (Oe)
ZFC
FC with 2 kOe

(c)

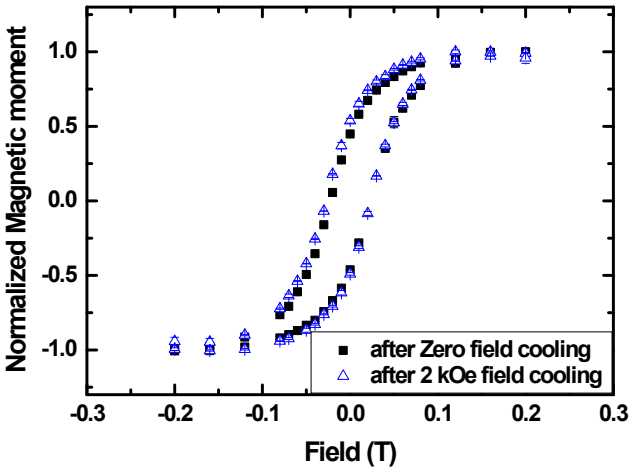

Normalized Magnetic moment
1.0
0.5
0.0
-0.5
-1.0
-0.3
-0.2
-0.1
0.0
0.1
0.2
0.3
Field (T)
after Zero field cooling
after 2 kOe field cooling

Fig. S4. Magnetization versus field curves at 2 K for the Fe_3O_4 nanoparticle LB monolayer films as a function of surface pressure (a) 10 mN/m, (b) 20 mN/m, and (c) 33 mN/m with the external magnetic field parallel to the film surface after zero field cooling (ZFC) and 2 kOe field cooling (FC).