Electronic Supplementary Material (ESI) for Nanoscale.


# FePt/Co core/shell nanoparticle based anisotropic nanocomposites and their exchange spring behavior

Deyao Li,[a] Hui Wang,[a] Zhenhui Ma,[a,b] Xin Liu,[a] Ying Dong,[a] Liu, Zhiqi[a], Tianli Zhang,*[a] and Chengbao Jiang*[a]

[a] School of Materials Science and Engineering, Beihang University, Beijing 100191, P.R. China

[b] School of Materials Science and Engineering, Shaanxi University of Science & Technology, Xi'an 710021, P.R. China

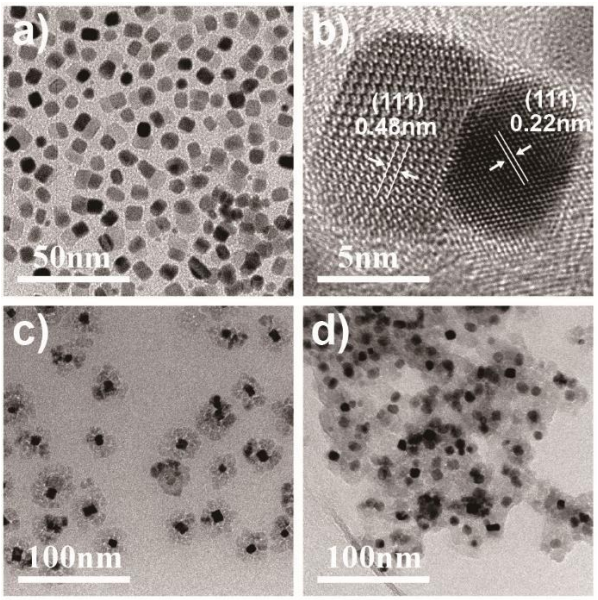


Fig. S1 a) TEM and b) HRTEM of fcc-FePt-$Fe_3O_4$ nanoparticles (NPs). The NPs show a dumbbell-like shape with 7.8 nm dark FePt and 5 nm grey $Fe_3O_4$. The interplanar spacing of 0.22 nm and 0.48 nm are consistent with (111) lattice planes of fcc-FePt and (111) lattice planes of fcc-$Fe_3O_4$, respectively. c) TEM image of fcc-FePt-$F_3O_4$/MgO nanocomposite. d) TEM image of fct-FePt/MgO nanocomposite. The fcc-FePt-$Fe_3O_4$ NPs were imbedded in MgO matrix which prohibited the aggregation during the annealing process.

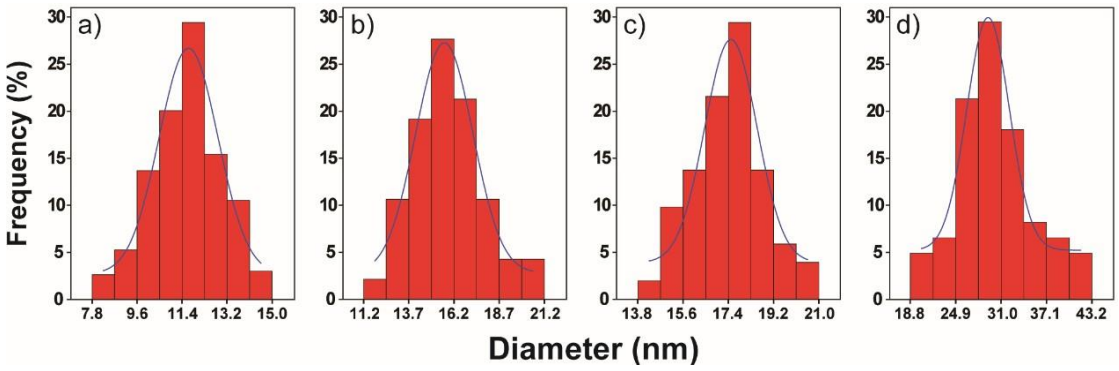


Fig. S2 a), b), c) and d) Diameter distribution of 11.7 nm-FePt NPs, FePt/1.9 nm-Co NPs, FePt/2.8 nm-Co NPs and FePt/8.7 nm-Co NPs, respectively.

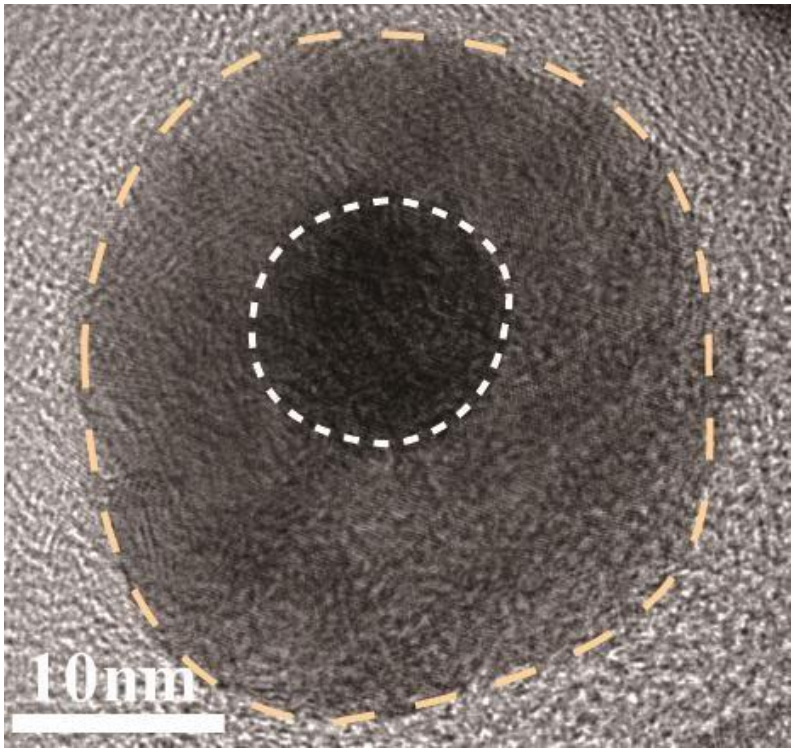


Fig. S3 Enlarged HRTEM image of FePt/8.7 nm-Co NPs in which more clear lattice fringes could be observed.

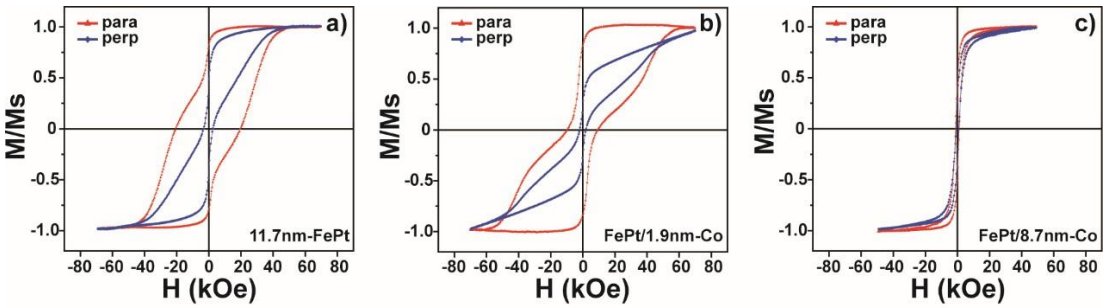


Fig. S4 *Para*- (red curve) and *perp*- (blue curve) hysteresis loops of 11.7 nm-FePt, FePt/1.9 nm-Co and FePt/8.7 nm-Co anisotropic nanocomposites, respectively.

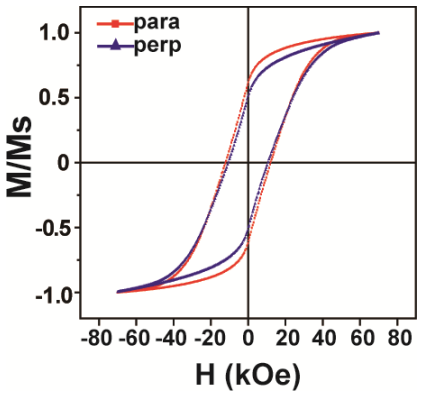


Fig. S5 Similar *para*- (red curve) and *perp*- (blue curve) hysteresis loops of FePt/2.8 nm-Co anisotropic nanocomposites with high nanoparticle concentration.