Thermal dewetting with a chemically heterogeneous nano-template for self-assembled $L1_0$ FePt nanoparticle arrays

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Supplementary information

Figure S1. Wide-angle XRD scans and TEM plan-view images of samples rapid-thermally annealed at 800 ^{0}C for 10 seconds. The layer structures are Si|SiO_2 substrates/PS (0 or 40 nm)/FePt (5 nm). While the (001) and (002) XRD peak reflections are observed in the sample without the PS layer, both peak reflections disappear in the scan of the PS/FePt sample. In addition, the PS insertion layer transforms the morphologies of annealed FePt layers from the isolated nanodots to stripes. The results suggest that the PS layer deteriorates both the $L1_0$ ordering and the film agglomeration of FePt layers.

Figure S2. TEM plan-view image of a 2-nm-thick FePt film grown on Template C and annealed at 800 ^{0}C for 10 seconds with the heating rate of 20 ^{0}C/sec. With reducing RTA heating rate, the provided in-plane tensile stress and degree of $L1_0$ ordering are decreased; therefore, the chemical potential difference between SiOC hemispheres and PS matrix is reduced, leading to the nanoparticle formation on SiOC and strips on PS.

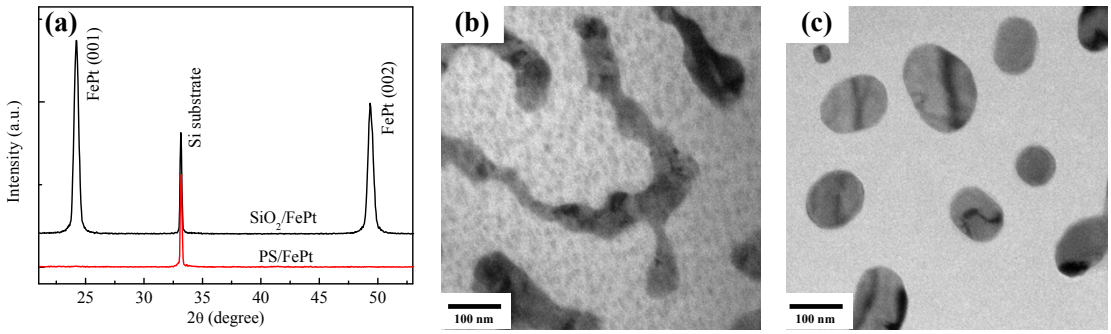
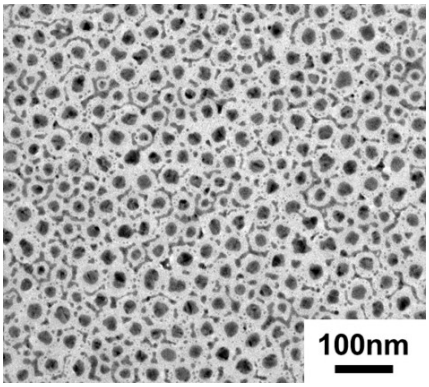


Figure S1. Wide-angle XRD scans of the rapid-thermally annealed FePt/ polystyrene bilayer and single-layered FePt films grown on flat Si|SiO_2 substrates. The corresponding TEM plan-view images are shown in (b) and (c).



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