# Templated Assembly of Co-Pt Nanoparticles via Thermal and Laser-Induced Dewetting of Bilayer Metal Films

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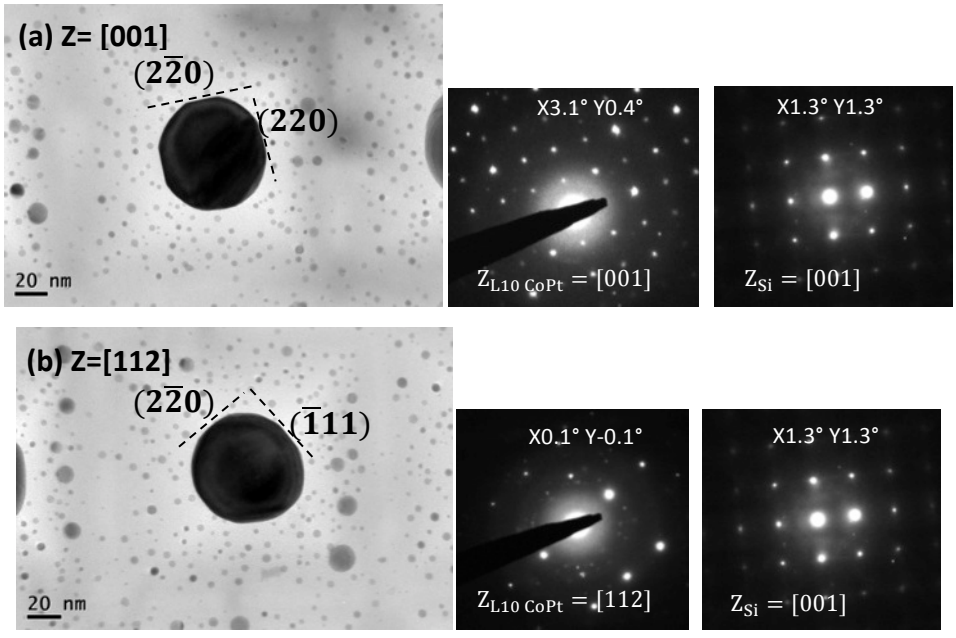
## Supporting Information

**Crystal orientation of CoPt particles:** Preferred crystal orientation of Co-52at.%Pt particles was investigated by obtaining TEM diffraction patterns for each particle in the sample. Figure S1 shows three typical zone axes of the particles oriented perpendicular to the substrate within a tolerance angle of 10°. Each analysis was recorded with the rotating and tilting angles of the sample stage when diffraction patterns were obtained. The same analysis was also performed for a silicon substrate as reference.



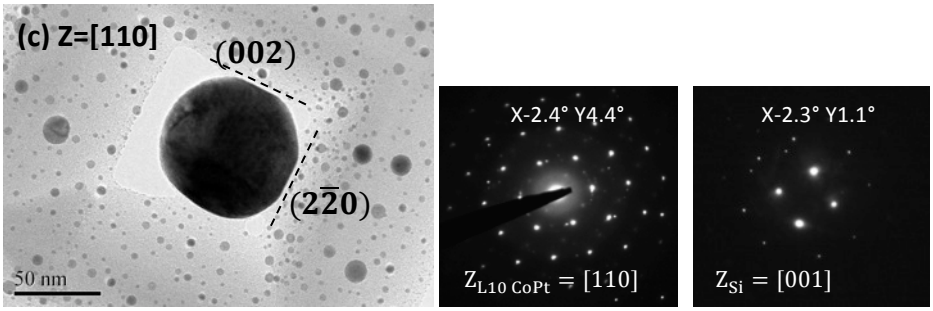



**Figure S1.** TEM micrographs and diffraction patterns for $L1_0$ CoPt particles formed by annealing at (a,b) 950 and (c) 900°C for 2 h. X and Y values in the diffraction patterns are the rotating and tilting angles of specimen stage in TEM respectively when the patterns are obtained. The angles for [001] silicon substrate were also represented as reference points.

**Conformity of CoPt particles formed by SSD and LSD:** Figure S2 compares TEM cross-section images of the particles formed by thermal annealing and UV pulse-laser irradiation. The CoPt particle formed by laser irradiation was conformal to the substrate topography within the inverted pyramidal pit.

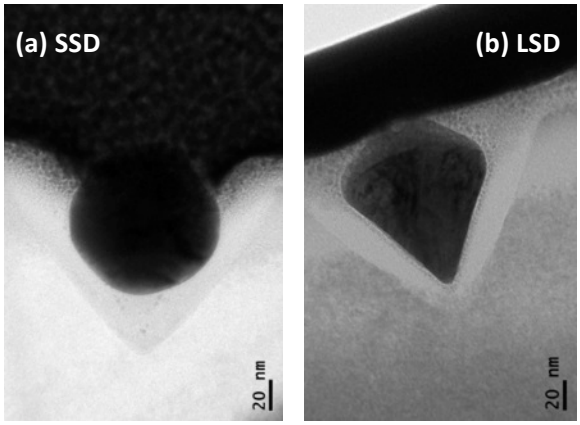



**Figure S2.** The cross-section TEM images of Co-52at.%Pt particles formed by (a) thermal annealing at 900°C for 2 h and (b) irradiation with 100 pulses of a UV laser at 85 mJ/cm$^2$.

**TEM observation of CoPt particles formed by LSD:** Figure S3 shows high resolution image and diffraction pattern for a CoPt particle formed via laser irradiation. The particle is polycrystalline and contains many defects. Superlattice diffraction spots ((001), (110), (201), etc),

which can be considered evidence for ordered fct-$L1_0$ phase, are not found.

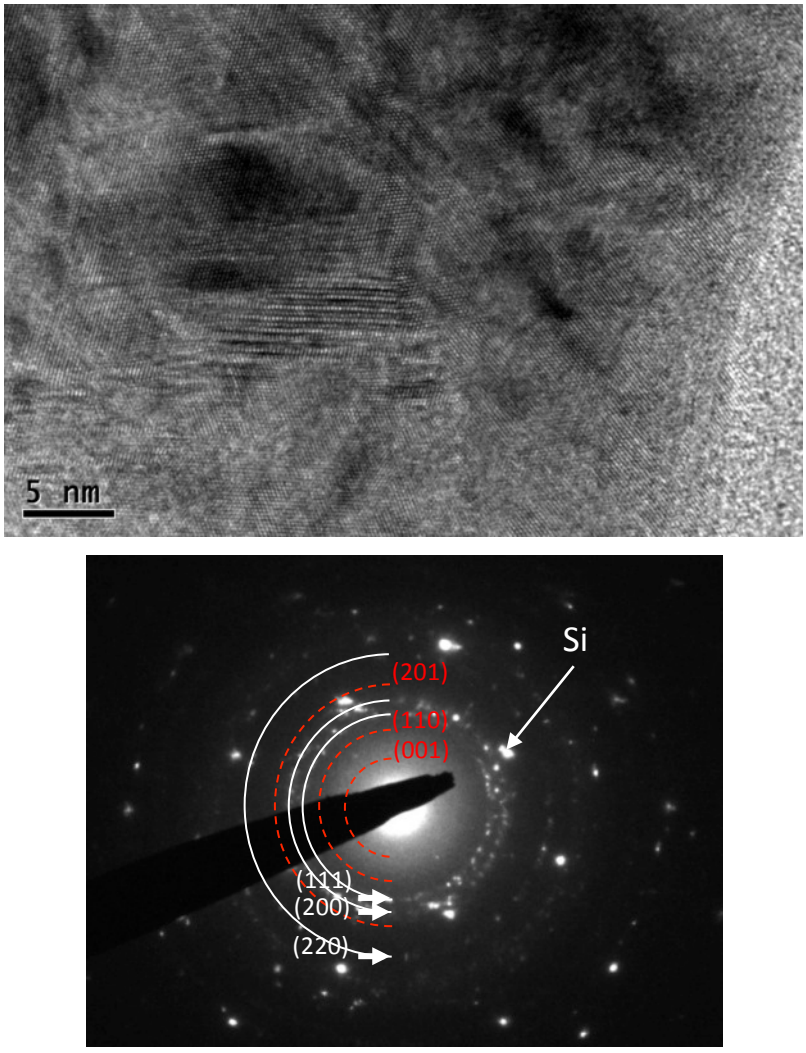



**Figure S3.** TEM image and diffraction pattern of Co-52at.%Pt particle formed by irradiation with 100 pulses of a UV laser at 85 mJ/cm$^2$.

**Magnetic properties of nanoparticles**. Fig. S4 shows the magnetic hysteresis loop of Co-52at.%Pt particles made by LSD under the same conditions as Fig. 7(d), but on a smooth substrate. This was measured using alternating gradient magnetometry in the range of 15 kOe. The loop shape and saturation magnetization are similar to that of the particles on the inverted pyramid substrate.

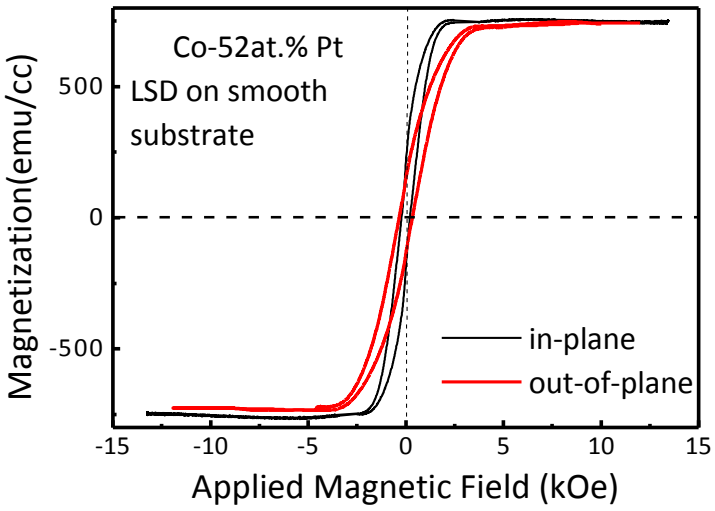



**Figure S4**. Magnetic hysteresis of LSD Co-52at.%Pt particles on a smooth silica substrate. Red: out of plane field, black: in plane field.