

Electronic Supplementary Information

**Growth mechanism and magnetic properties of monodisperse L1<sub>0</sub>-  
Co(Fe)Pt@C core-shell nanoparticles by one-step solid-phase  
synthesis**

Baoru Bian<sup>\*a</sup>, Jianghai He<sup>a</sup>, Juan Du<sup>a</sup>, Weixing Xia<sup>a</sup>, Jian Zhang<sup>a</sup>, J. Ping Liu<sup>b</sup>, Wei Li<sup>c</sup>,  
Chunfeng Hu<sup>a</sup>, and Aru Yan<sup>a</sup>

a. Key Laboratory of Magnetic Materials and Devices, Ningbo Institute of Material  
Technology & Engineering, Chinese Academy of Sciences, Ningbo 315201, People's  
Republic of China

b. Department of Physics, University of Texas at Arlington, Arlington, TX, United States.

c. Division of Functional Materials, Central Iron and Steel Research Institute, Beijing, 100081,  
People's Republic of China

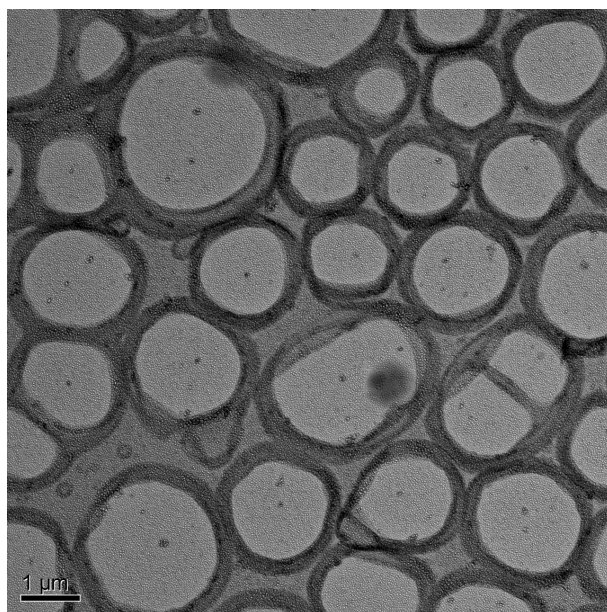


Fig.S1 TEM images of the CoPt NPs sintered at 550 °C for 1h

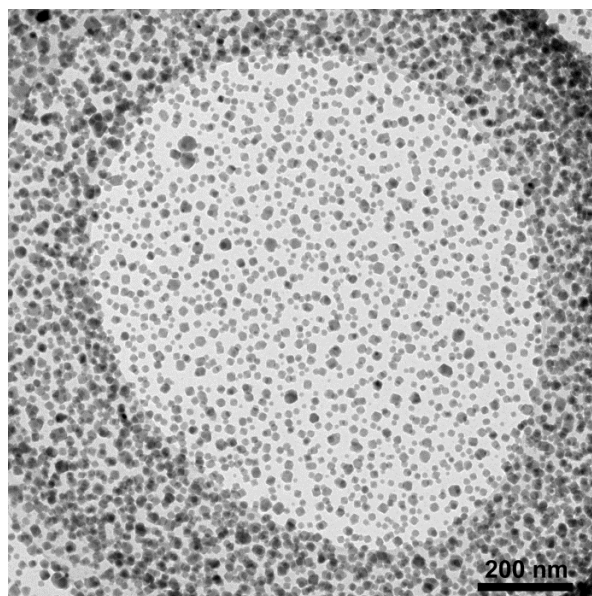


Fig.S2 TEM images of the CoPt NPs sintered at 550 °C for 1h

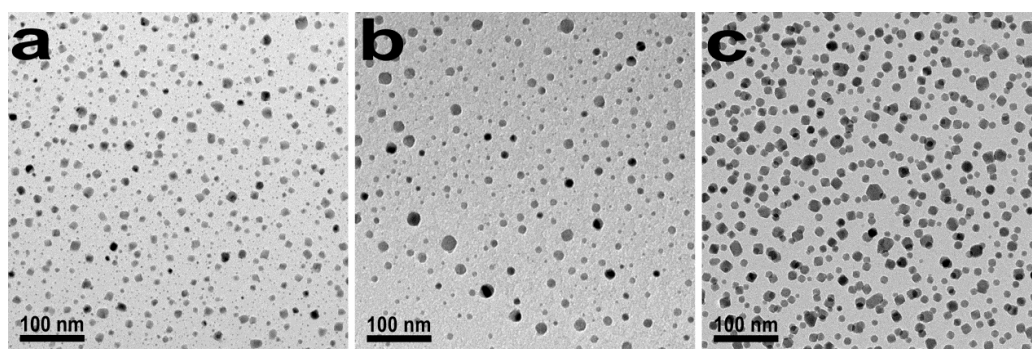
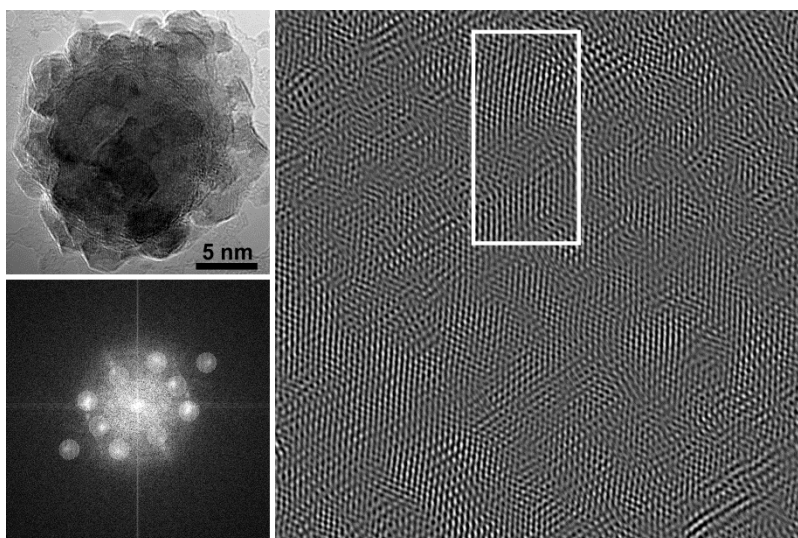


Fig.S3 TEM images of the CoPt NPs when the temperature rise up to 400 °C, 550 °C and sintered at 550 °C for 1h



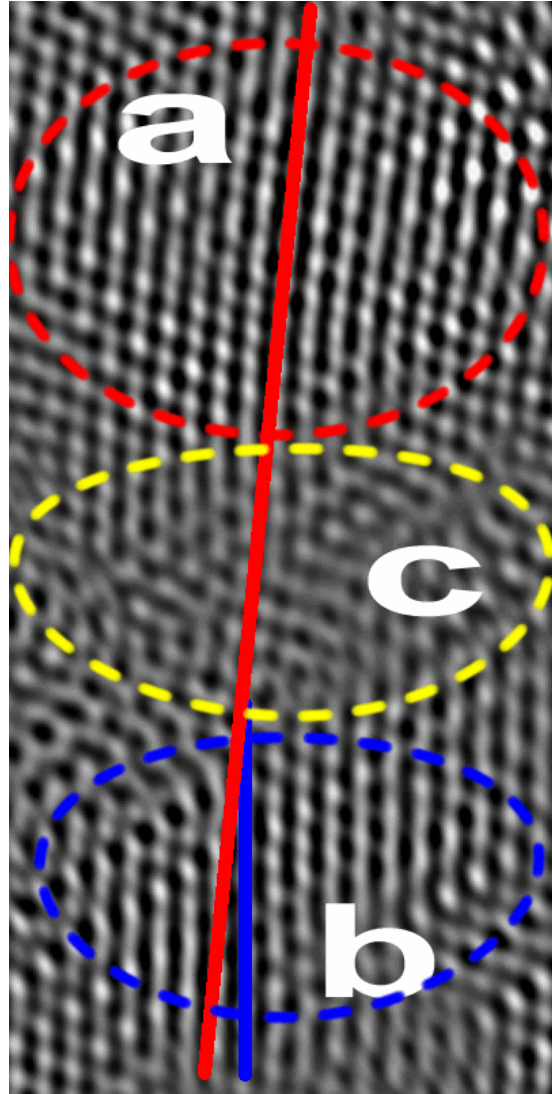


Fig.S4 HRTEM images of the CoPt cluster when the temperature rise up to 400 °C. Through IFFT image we can see that the nanoparticles with many structure defects. Fig.S4 shows the big cluster formed by lots of small particles containing many grain boundaries. There are lots of misorientations between small particles. The enlarged image is the part of the large cluster indicated by the white square frame. The lattices of the (a) and (b) zones are not very aligned, clearly shown by the red and blue lines. The interface is seen at region (c) indicate by the yellow circle.

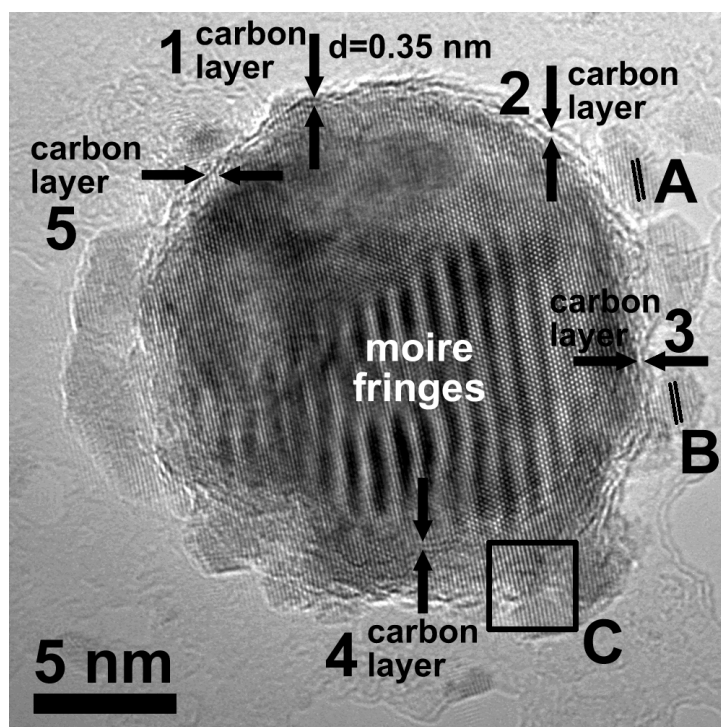


Fig.S5 HRTEM images of the CoPt cluster when the temperature rise up to to  $550 \text{ }^{\circ}\text{C}$

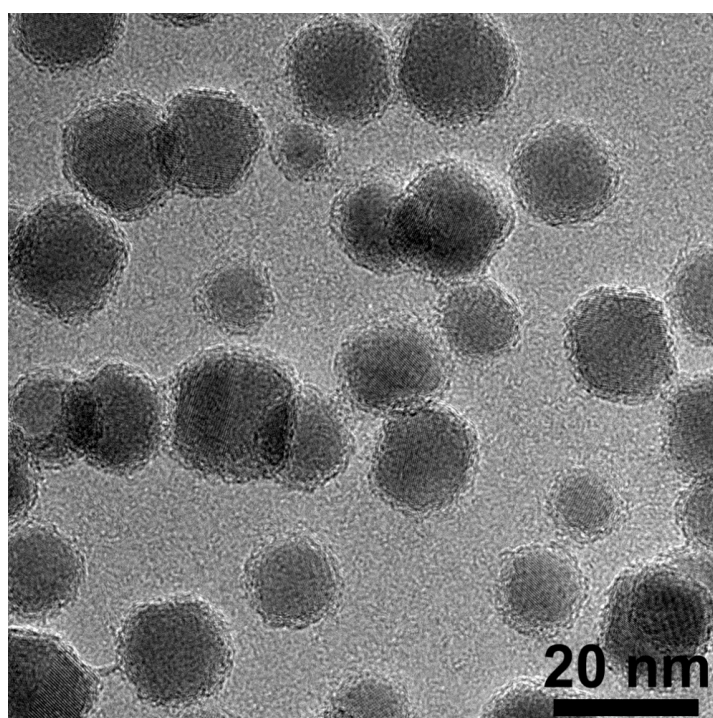


Fig.S6 TEM images of the CoPt@C NPs after sintered at  $550 \text{ }^{\circ}\text{C}$  for 1h. A thin layer of carbon coated on the outer of all the particles.

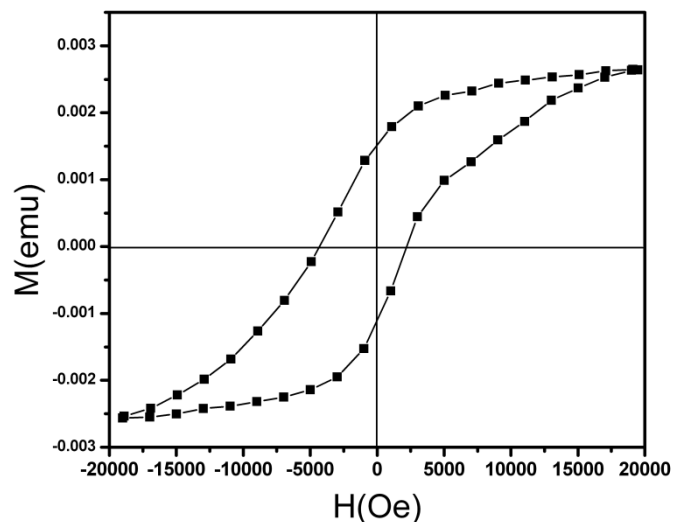


Fig.S7 M-H loop of CoPt NPs annealed at 550°C

### S1. Methods:

**Preparation of L1<sub>0</sub>-FePt NPs for magnetic measurement:** The precursor Fe(acac)<sub>3</sub> and Pt(acac)<sub>2</sub> dissolved in acetyl acetone solution and then mixed with NaCl (the NaCl/precursor mass ratio is greater than 1000:1.) and milled for 24 h, and the size of the NaCl was about 3  $\mu\text{m}$ . Then, the powder was heated (heating rate = 10  $^{\circ}\text{C min}^{-1}$ ) up to 550  $^{\circ}\text{C}$  in a reducing atmosphere of 8% H<sub>2</sub> and 92% Ar. Then the samples were kept at the final temperature for 1 h. After cooling down, a black powder was collected, and washed with water.

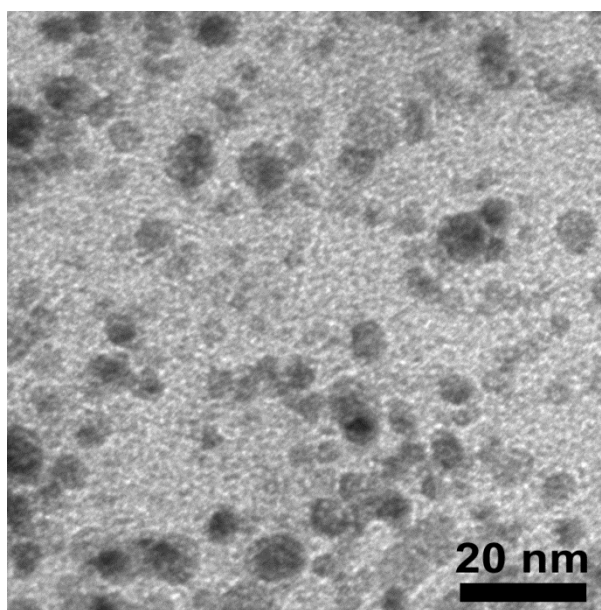


Fig.S8 TEM images of the FePt NPs after sintered at 550  $^{\circ}\text{C}$  for 1h