

Cu induced low temperature ordering of fct-FePtCu nanoparticles prepared by solution phase synthesis

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Supporting information including:

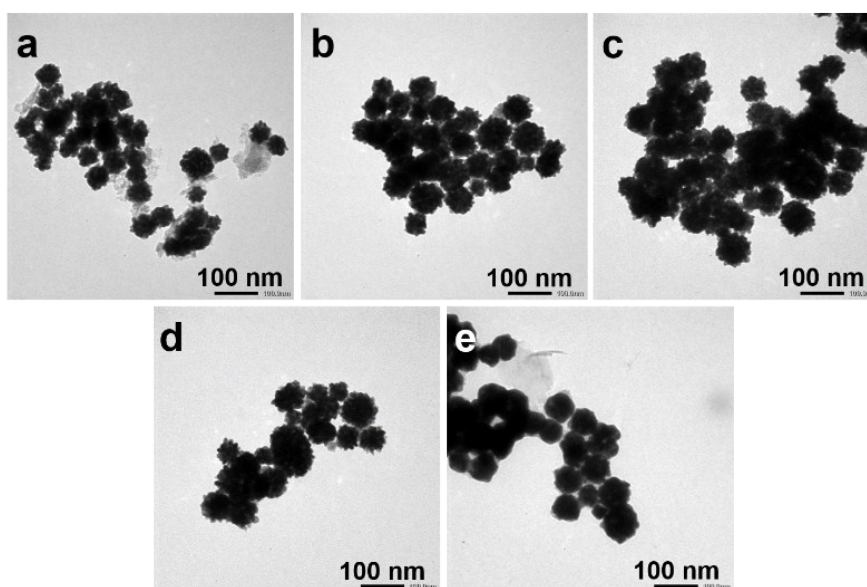


Fig. S1. The TEM of FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at various temperature for 3 h: (a) 270 °C, (b) 290 °C, (c) 310 °C, (d) 330 °C and (e) 350 °C.

Table S1

Composition, magnetic properties and lattice parameters measured using XRD of the fct-phases for FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at various reaction temperature for 3 h.

| Reaction temperature (°C) | Measured composition | $d_{(111)}$ (nm) | a (nm) | c (nm) | c/a | S |
|---------------------------|--|------------------|----------|----------|-------|-------|
| 270 | $\text{Fe}_{30}\text{Pt}_{54}\text{Cu}_{16}$ | 0.223 | 0.386 | 0.386 | 1 | 0 |
| 290 | $\text{Fe}_{33}\text{Pt}_{52}\text{Cu}_{15}$ | 0.223 | 0.387 | 0.386 | 0.998 | 0.238 |
| 310 | $\text{Fe}_{32}\text{Pt}_{53}\text{Cu}_{16}$ | 0.222 | 0.386 | 0.380 | 0.985 | 0.654 |

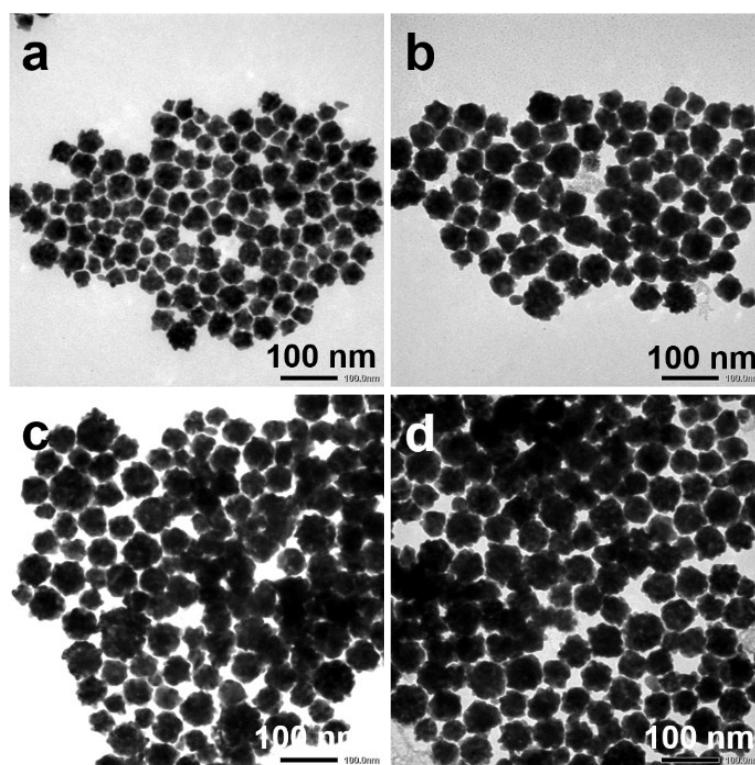


Fig. S2. The TEM of FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at 310 °C for various reaction time: (a) 1 h, (b) 3 h, (c) 6 h and (d) 9 h.

Table S2

Composition, magnetic properties and lattice parameters measured using XRD of the fct-phases for FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at 310 °C for various reaction time.

| Reaction time (h) | Measured composition | $d_{(111)}$ (nm) | a (nm) | c (nm) | c/a | S |
|-------------------|--|------------------|----------|----------|-------|-------|
| 1 | $\text{Fe}_{30}\text{Pt}_{54}\text{Cu}_{16}$ | 0.222 | 0.387 | 0.386 | 0.998 | 0.222 |
| 3 | $\text{Fe}_{32}\text{Pt}_{53}\text{Cu}_{15}$ | 0.222 | 0.386 | 0.380 | 0.984 | 0.654 |
| 6 | $\text{Fe}_{39}\text{Pt}_{48}\text{Cu}_{13}$ | 0.220 | 0.385 | 0.374 | 0.971 | 0.894 |
| 9 | $\text{Fe}_{44}\text{Pt}_{43}\text{Cu}_{13}$ | 0.220 | 0.386 | 0.373 | 0.967 | 0.957 |

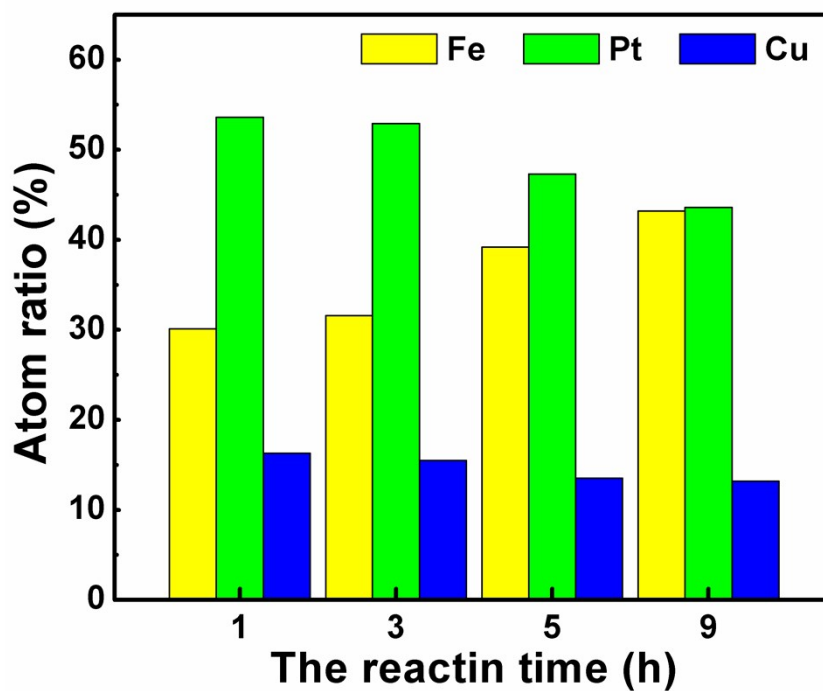


Fig. S3. The composition analysis of the fct-FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at 310 °C for various reaction time.

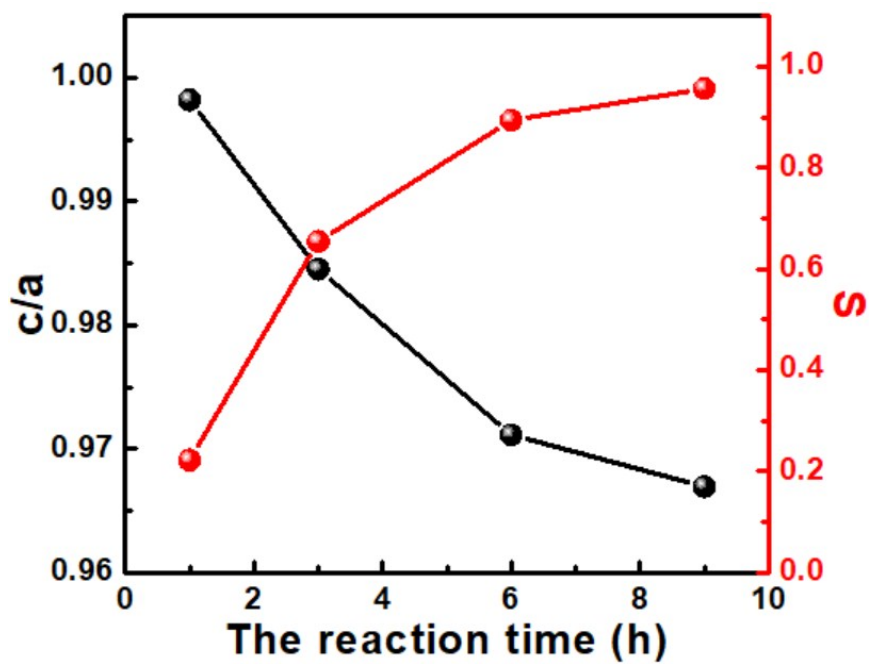


Fig. S4. The c/a ratios and order parameter S versus reaction time of the fct-FePtCu NPs synthesized with a $\text{Cu}^{2+}/\text{Pt}^{4+}$ mole ratio of 0.25 at 310 °C for various reaction time.