

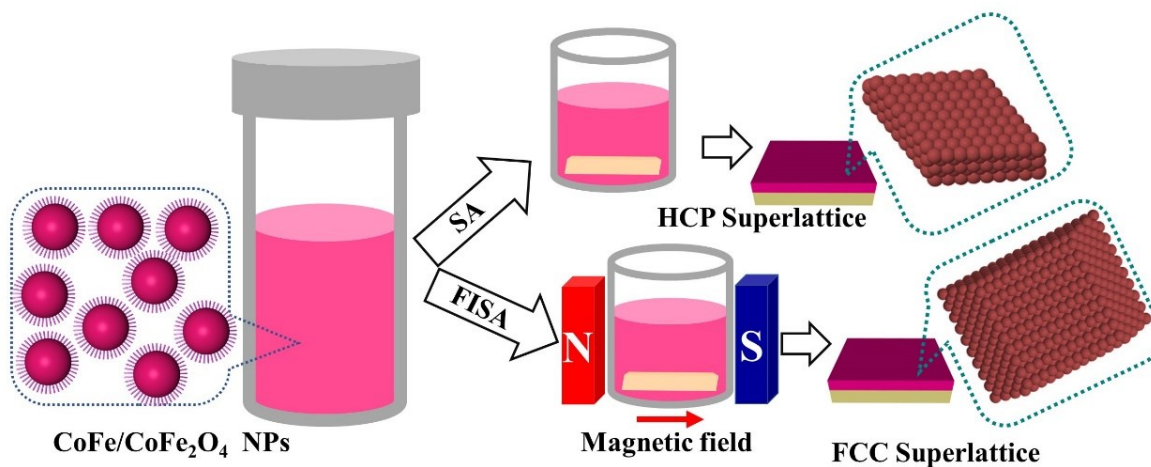
## Magnetic-field-induced self-assembly of FeCo/CoFe<sub>2</sub>O<sub>4</sub> core/shell nanoparticles with tunable collective magnetic properties

J. Mohapatra,<sup>a</sup> J. Elkins,<sup>a</sup> M. Xing,<sup>a</sup> D. Guragain,<sup>b</sup> Sanjay R Mishra,<sup>b</sup> and J. Ping Liu<sup>a,\*</sup>

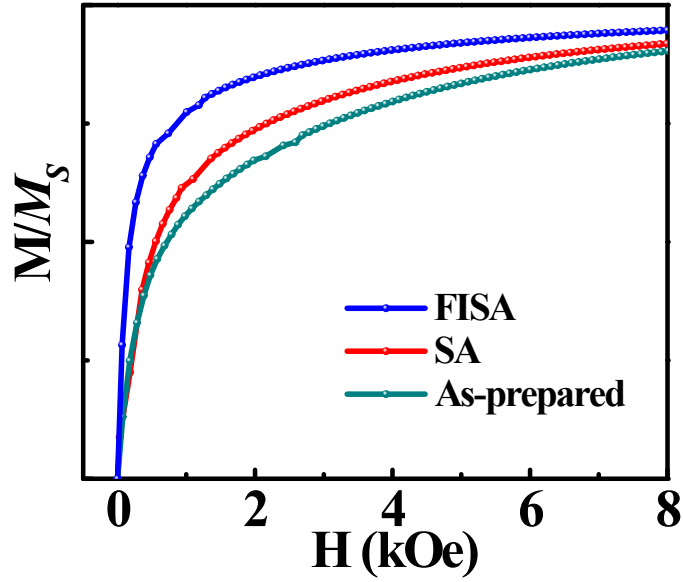
a. Department of Physics, The University of Texas at Arlington, Arlington, Texas 76019, USA

b. Department of Physics and Materials Science, The University of Memphis, Memphis, TN 38152

*\*To whom correspondence should be addressed. E-mail: pliu@uta.edu (J. Ping Liu). Phone: +1-817-272-2815*



**Figure S1.** Schematic illustration of the experimental setup of evaporation self-assembly and field-induced self-assembly of the FeCo/CoFe<sub>2</sub>O<sub>4</sub> core/shell nanoparticles.



**Figure S2.** First quadrant magnetization curves at temperature 5 K for the  $\text{CoFe}_2\text{O}_4$  and  $\text{FeCo}/\text{CoFe}_2\text{O}_4$  nanoparticles.

**Table S1.** Characteristic relaxation time ( $\tau_0$ ) and inter-particle interaction energy ( $T_0$ ) obtained by Vogel-Fulcher model and power law model fitting of the ac susceptibility data.

Sample Code	Vogel-Fulcher law		Power law		
	$T_0$ (K)	$\tau_0$ (sec)	$T_0$ (K)	$\tau_0$ (sec)	$z\nu$
As-prepared $\text{FeCo}/\text{CoFe}_2\text{O}_4$ nanoparticles	275	$5.4 \times 10^{-11}$	270	$8.2 \times 10^{-13}$	$11 \pm 2.5$
SA of $\text{FeCo}/\text{CoFe}_2\text{O}_4$ nanoparticles	294	$4.9 \times 10^{-10}$	284	$3.5 \times 10^{-10}$	$9 \pm 2$
FISA of $\text{FeCo}/\text{CoFe}_2\text{O}_4$ nanoparticles	320	$2.1 \times 10^{-7}$	319	$5.6 \times 10^{-9}$	$7 \pm 2$

