# Supporting Information

## Construction and Application of $\alpha$-$Fe_2O_3$ Nanocubes Dominated by the Composite Interaction between Polyvinyl Chloride and Potassium Ferrocyanide

Pu Du[a], Le Xin Song*[a,b], Juan Xia*[b], Yue Teng[b] and Zheng Kun Yang[a]

[a]*Department of Chemistry, University of Science and Technology of China, Jin Zhai Road 96, Hefei 230026, China*
[b]*CAS Key Laboratory of Materials for Energy Conversion, Department of Materials Science and Engineering, University of Science and Technology of China, Jin Zhai Road 96, Hefei 230026, China*

solexin@ustc.edu.cn xiajuan@mail.ustc.edu.cn

**A list of the contents for all the Supporting Information**

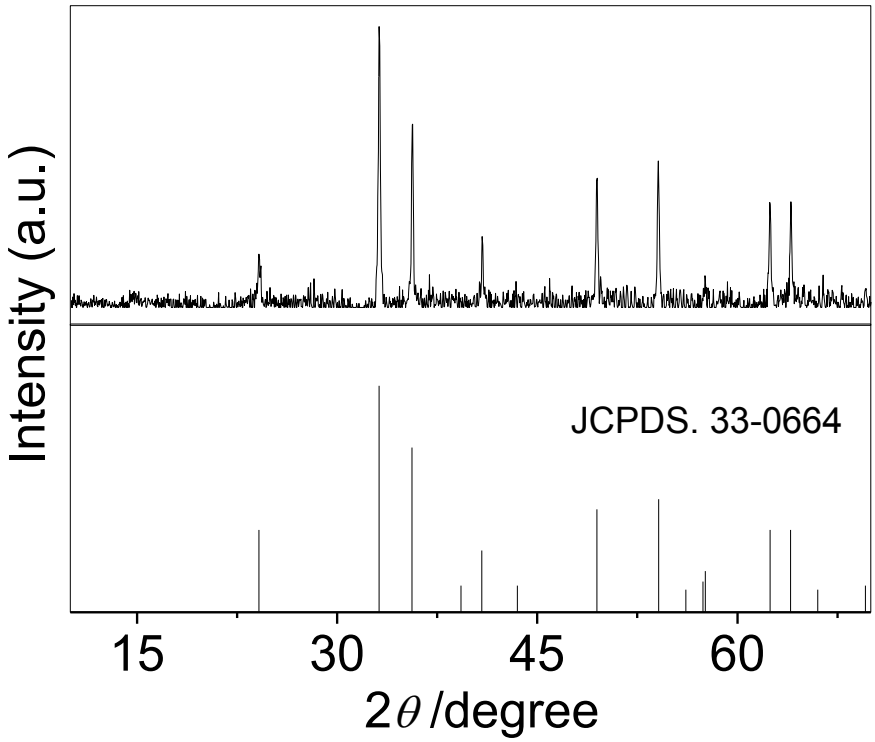


**Fig. S1** XRD pattern of the $\alpha$-$Fe_2O_3$ nanoparticles obtained by sintering PF at 800 K for 8 h.

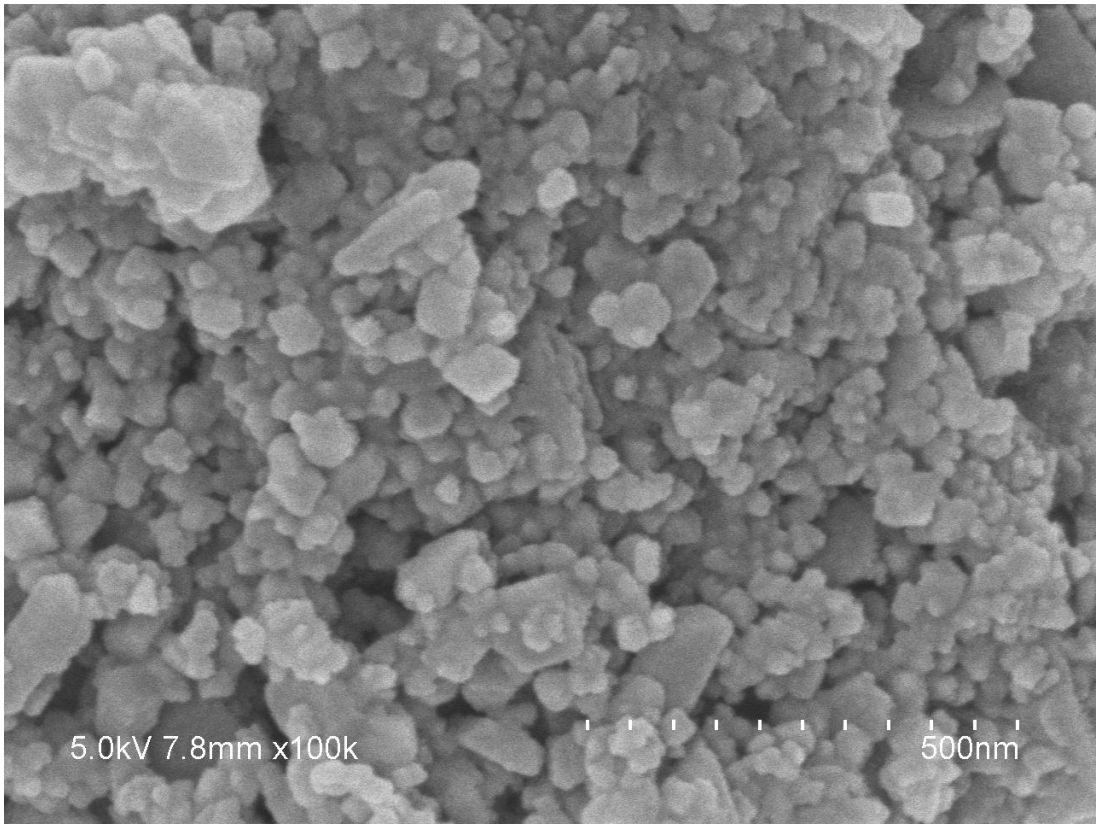


**Fig. S2** FE-SEM image of the $\alpha$-$Fe_2O_3$ nanoparticles obtained by sintering PF at 800 K for 8 h.

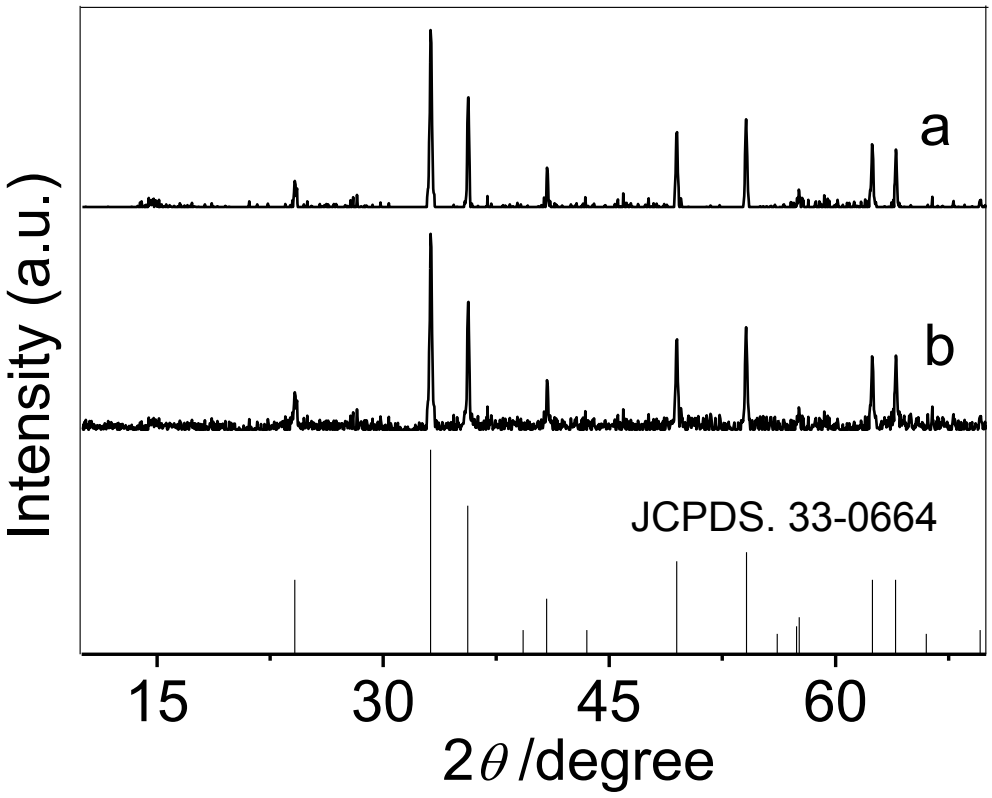


**Fig. S3** XRD patterns of the $\alpha$-$Fe_2O_3$ nanoparticles obtained by sintering PVC/PF-10 (a) and PVC/PF-50 (b) at 800 K for 8 h.

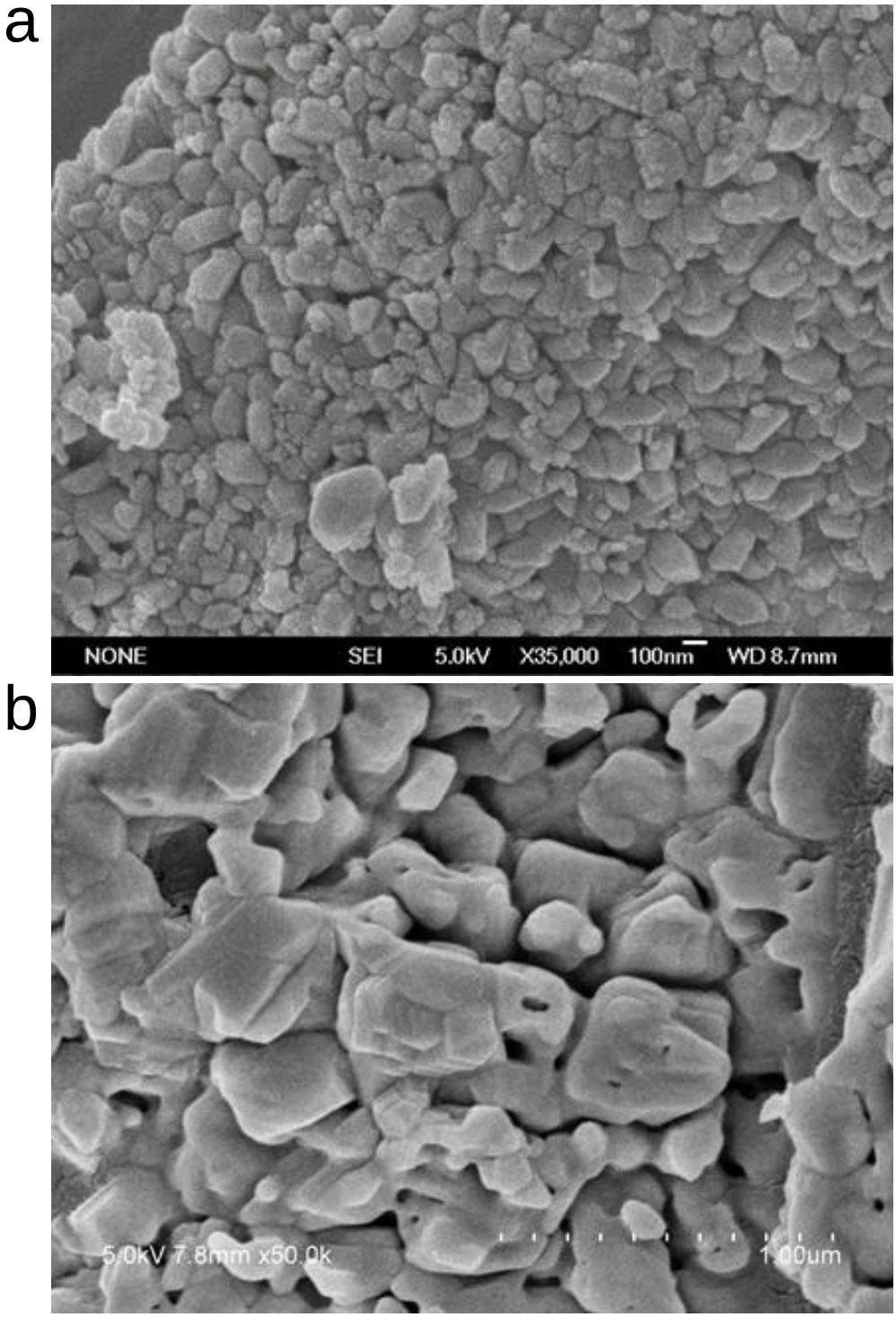


**Fig. S4** FE-SEM images of the $\alpha$-$Fe_2O_3$ nanoparticles obtained by sintering PVC/PF-10 (a) and PVC/PF-50 (b) at 800 K for 8 h.

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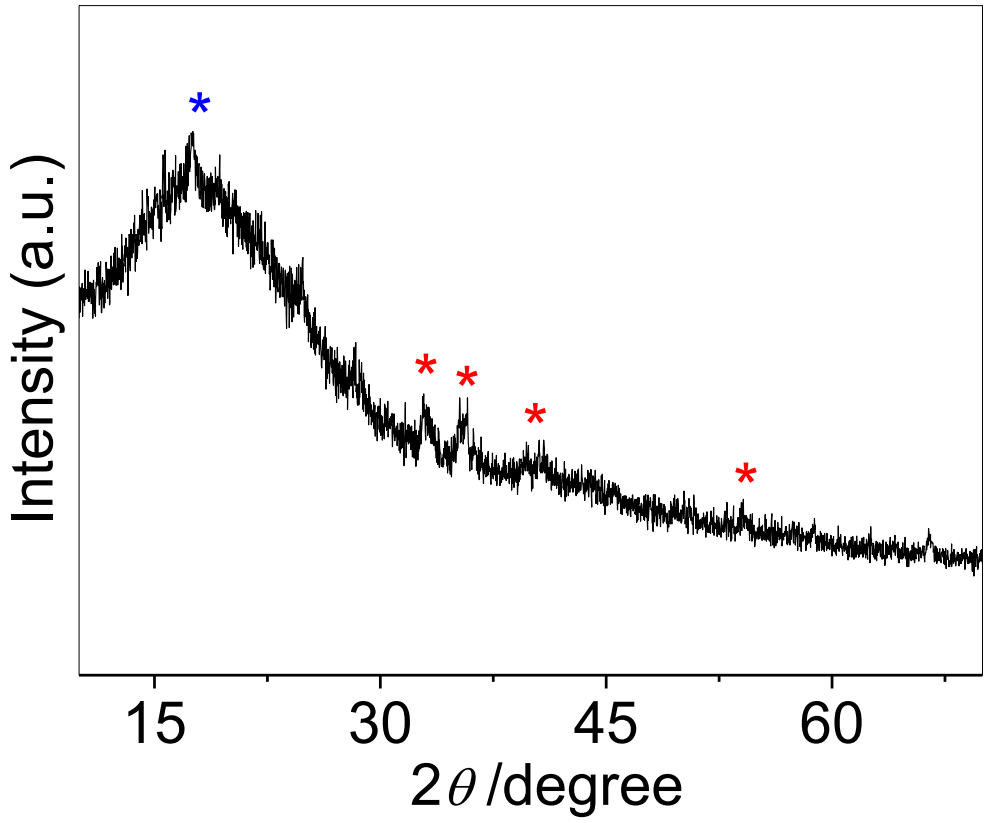


**Fig. S5** XRD pattern of the $\alpha$-$Fe_2O_3$ nanoparticles and carbon obtained by sintering PVC/PF-20 in a sealed muffle furnace environment at 500 K for 1 h (the blue asterisk denotes the peak of carbon and the red asterisks denote the peaks of $\alpha$-$Fe_2O_3$ nanoparticles).

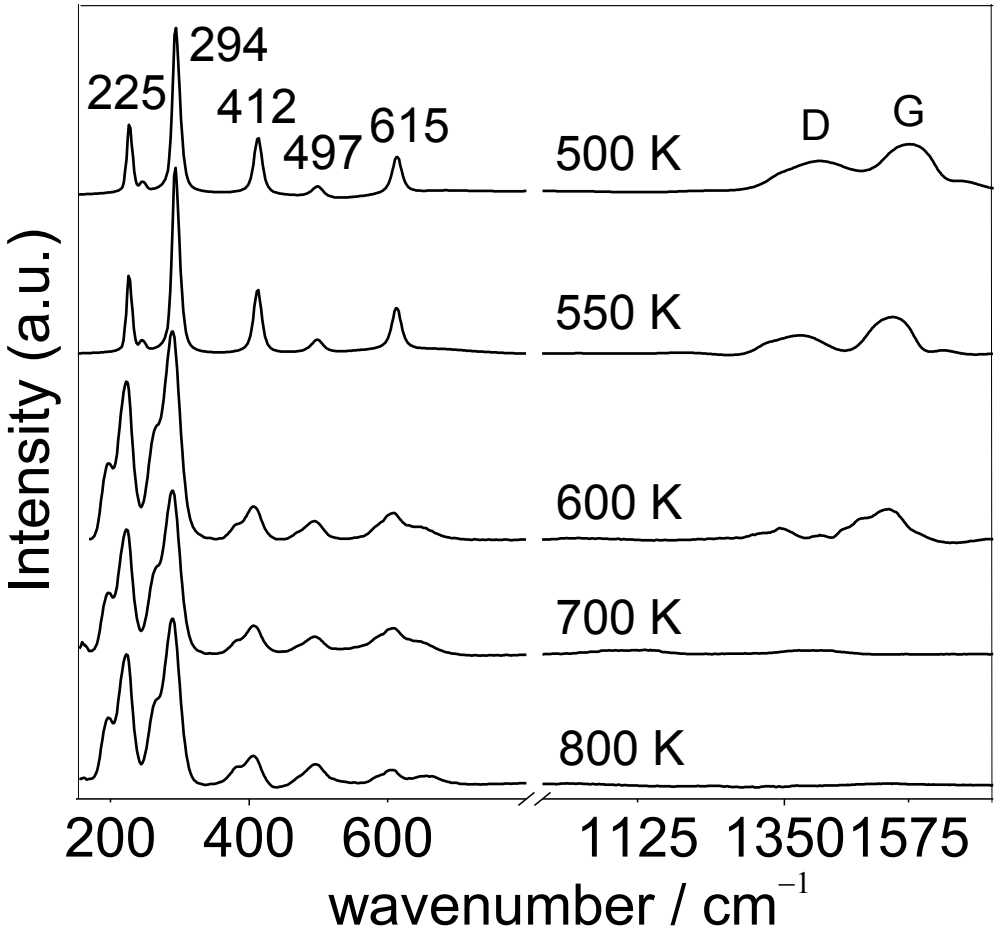


**Fig. S6** Raman spectra of the $\alpha$-$Fe_2O_3$ nanomaterials obtained at 500, 550, 600, 700 and 800 K for 1 h.

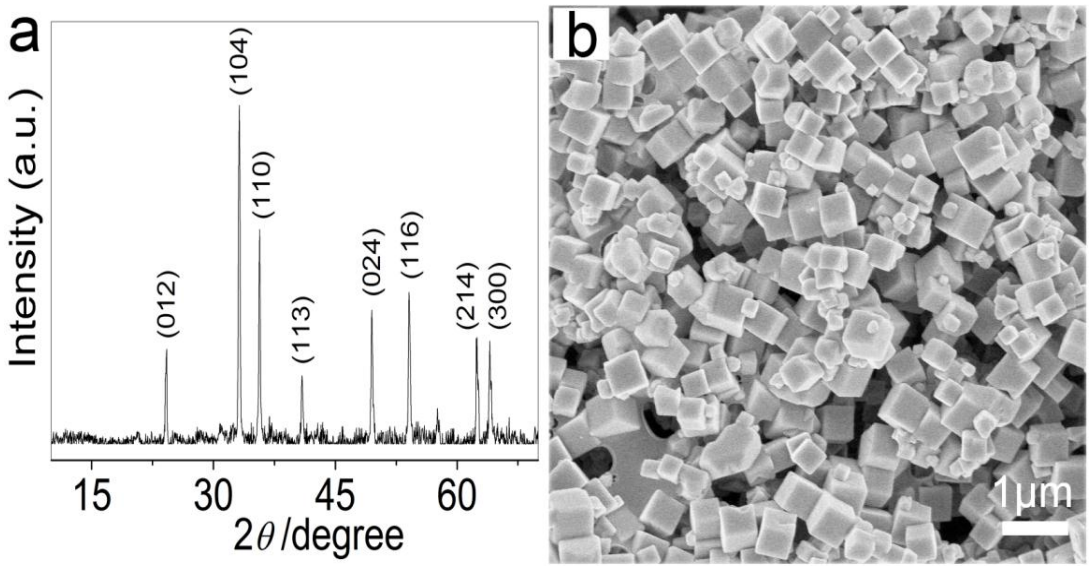


**Fig. S7** The XRD pattern and SEM image of the $\alpha$-$Fe_2O_3$ obtained by sintering the PVC/PF-20 at 900 K for 1 h.

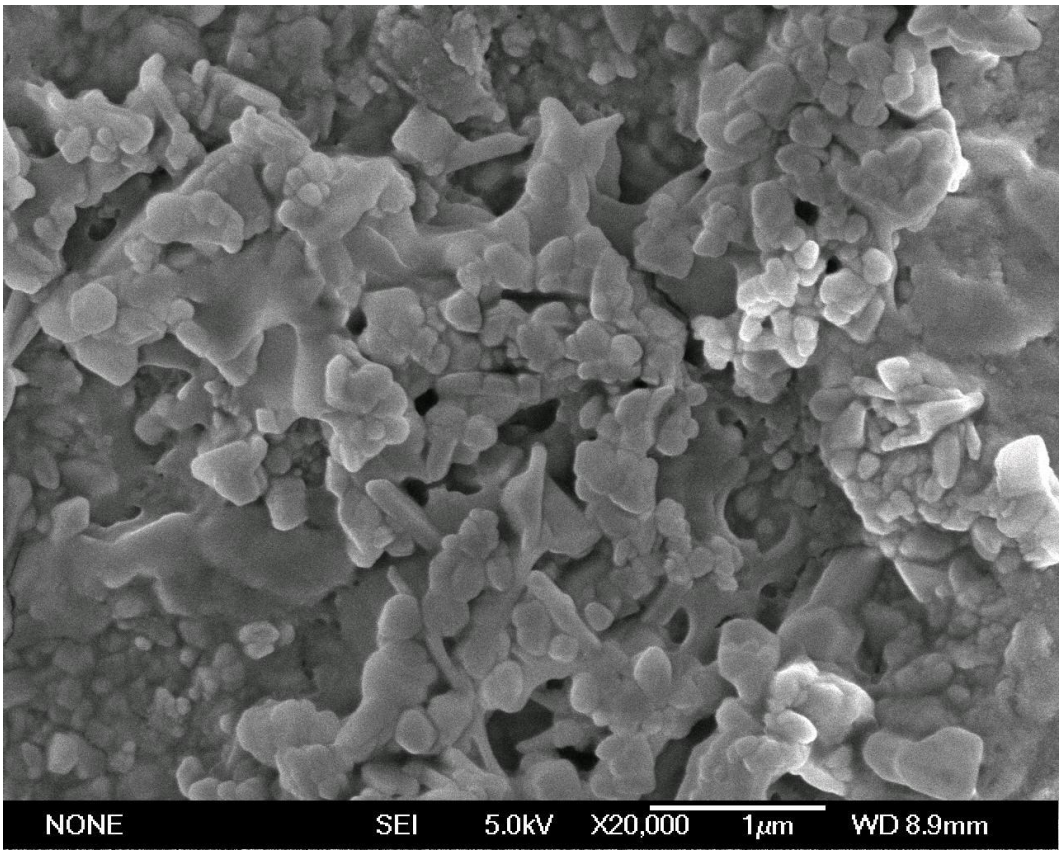


**Fig. S8** FE-SEM image of the $\alpha$-$Fe_2O_3$ nanoparticles obtained by sintering free PF at 600 K for 1 h.

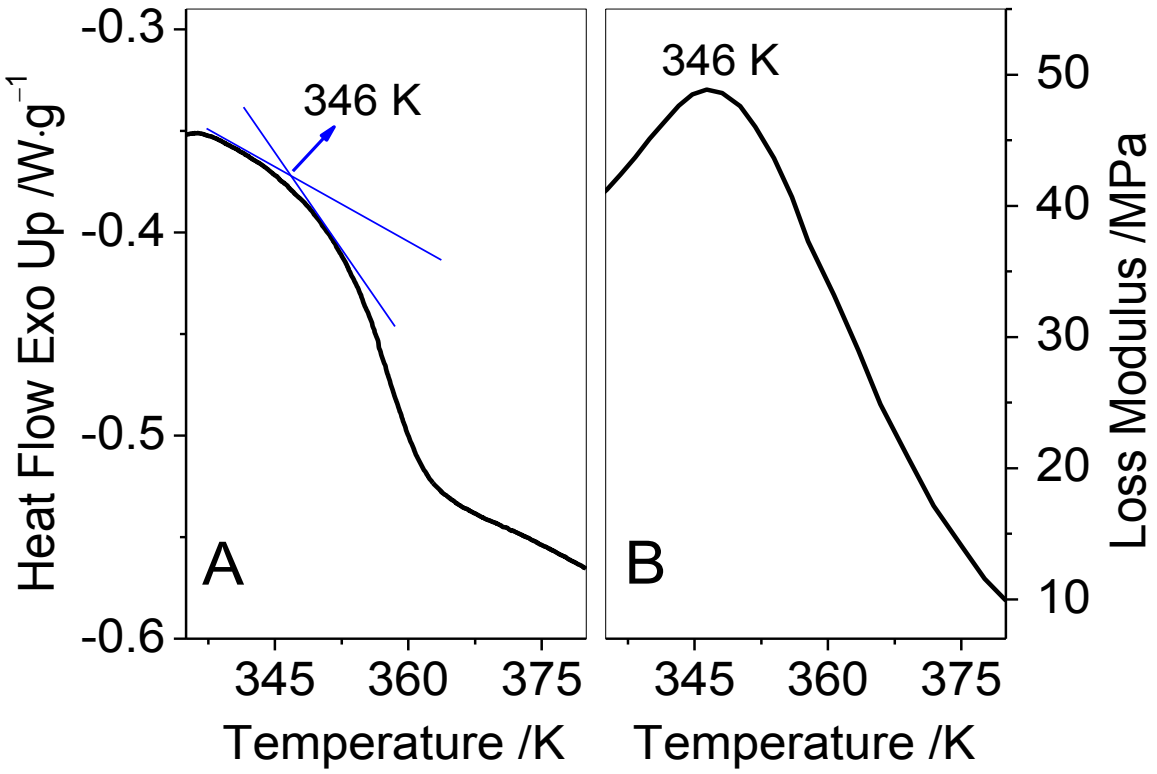


**Fig. S9** DSC (A) and DMA (B) curves of the PVC/PF-20 at the temperature from 335~380 K.

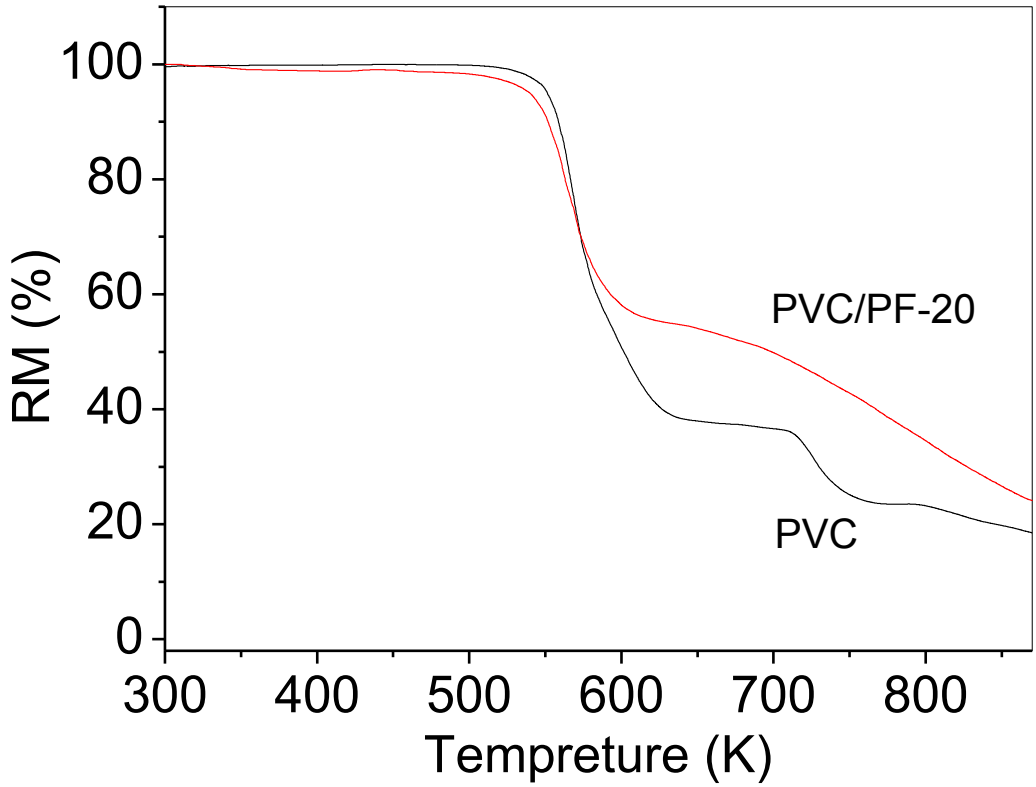


**Fig. S10** TG curves of free PVC and the PVC/PF-20 under nitrogen atmosphere.

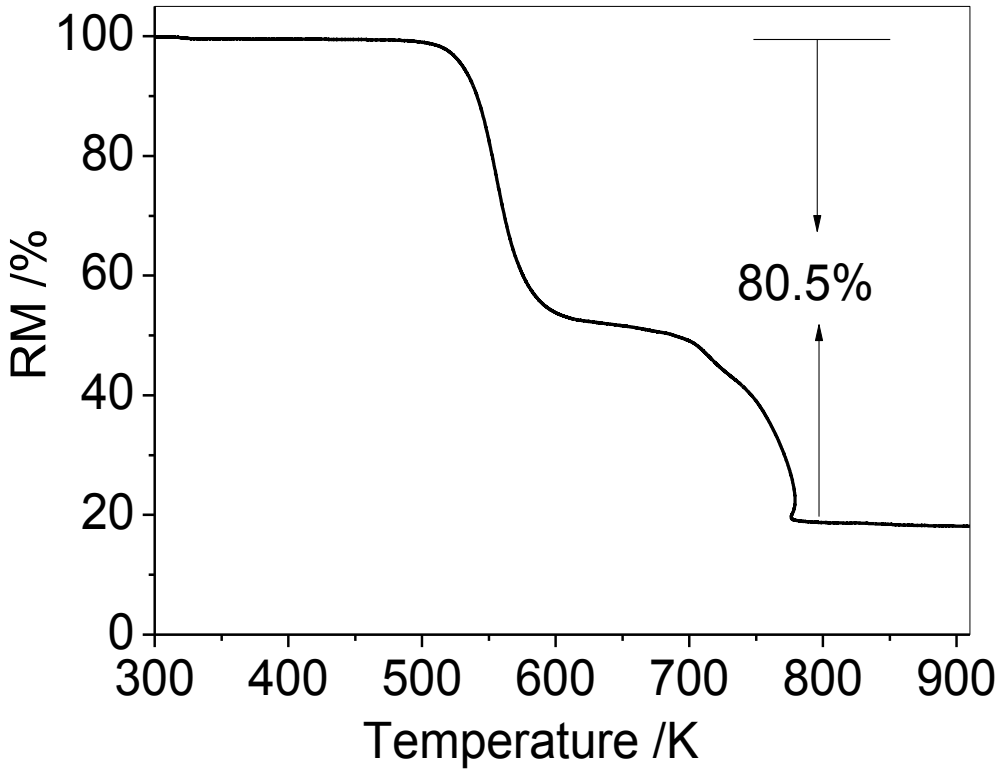


**Fig. S11** The TG curve of the PVC/PF-20 under air.

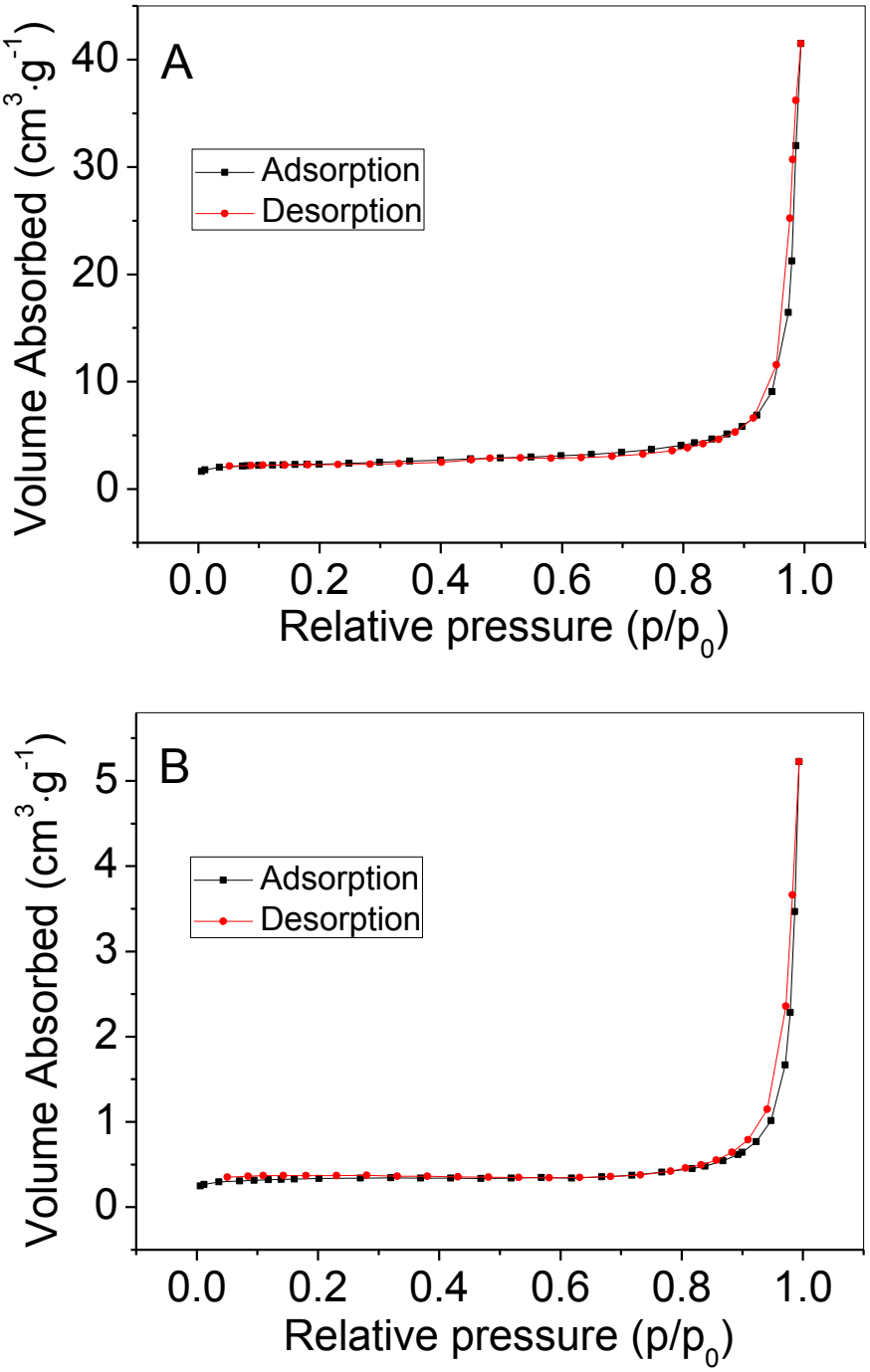


**Fig. S12** $N_2$ adsorption-desorption isotherm of the $\alpha$-$Fe_2O_3$ nanocubes (A) and nanoparticles (B).