

## SUPPLEMENTARY INFORMATION

### Reversible post-synthesis tuning of the superparamagnetic blocking temperature of $\gamma$ -Fe<sub>2</sub>O<sub>3</sub> nanoparticles by adsorption and desorption of Co (II) ions

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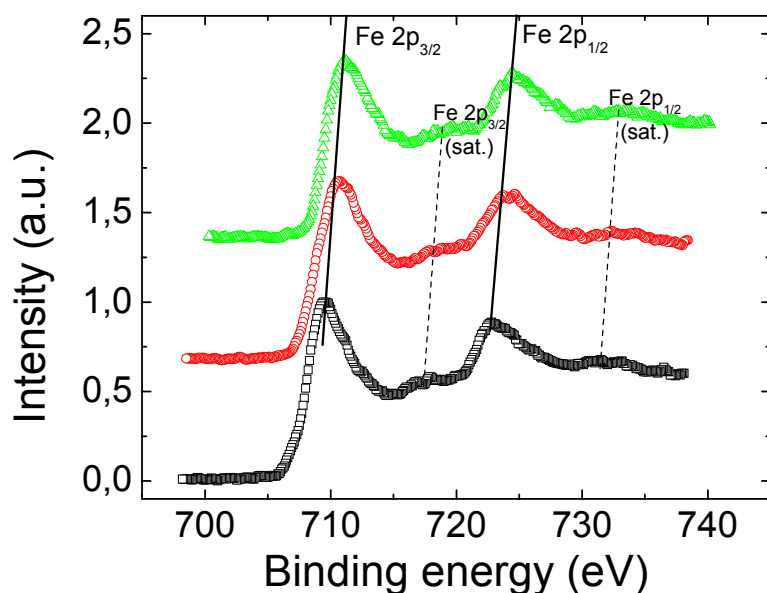
**X-ray Photoelectron Spectroscopy**

Figure S1. XPS Fe (2p) core level spectra of samples CF0 (squares), CF35 (circles) and CF200 (triangles).

Figure S1 shows the iron core line spectra of samples with an increasing concentration of cobalt, i.e., samples CF0, CF35, and CF200. The position of the absorption edge as well as the non-smearred satellite structures (about 8 eV higher than the parent lines) for CF0 agree quite reasonably with the reported structure of  $\gamma\text{-Fe}_2\text{O}_3$ .<sup>S1</sup> Furthermore, the increase of the Fe (2p) absorption edge with cobalt adsorption agrees with the formation of  $\text{CoFe}_2\text{O}_4$ .<sup>S2</sup>

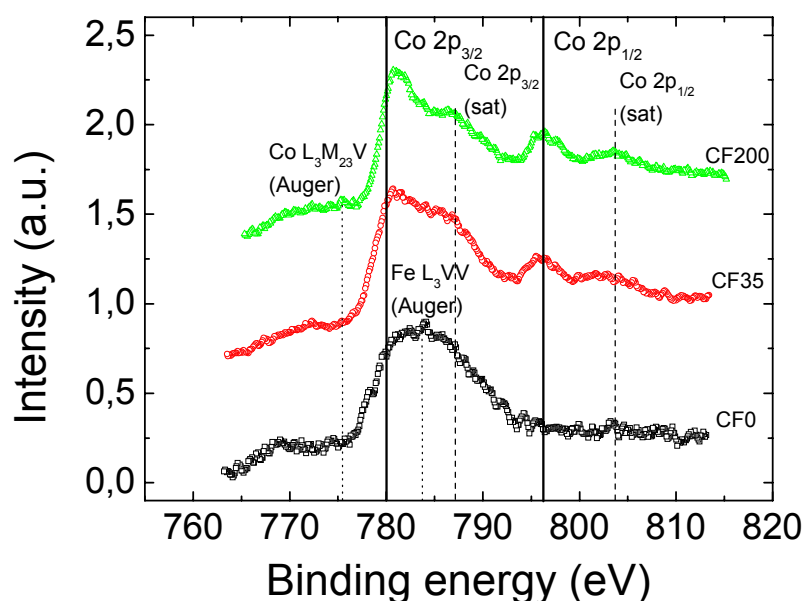


Figure S2. XPS Co (2p) core level spectra of samples CF0 (squares), CF35 (circles) and CF200 (triangles).

Figure S2 shows the XPS Co (2p) core level spectra of different samples with increasing concentration of cobalt, namely, samples CF0, CF35, and CF200. From the figure it can be seen that the core edge of cobalt coincides with the Fe L<sub>3</sub>VV Auger line and due to such overlapping it is not possible to obtain a quantitative analysis. However, it can be seen from the figure that the surface concentration of cobalt increases from sample CF0 to CF200. Furthermore, the satellite structure of the Co 2p<sub>3/2</sub> and Co 2p<sub>1/2</sub> (about 7 eV higher than the parent line) is typical for the high spin Co(II) ions, consistent with the formation of CoFe<sub>2</sub>O<sub>4</sub>.<sup>S2</sup>

## References

- S1 T. Fujii, F.M.F. de Groot, G.A. Sawatzky, F.C. Voogt, T. Hibma, K. Okada, *Phys. Rev. B* 1999, **59**, 3195.
- S2 S.A. Chambers, R.F.C. Farrow, S. Maat, M.F. Toney, L. Folks, J.G. Catalano, T.P. Trainor, G.E. Brown, *J. Magn. Mater.* 2002, **246**, 124.