Electronic Supplementary Material (ESI) for Nanoscale
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SUPPLEMENTARY INFORMATION

Controlled 3D coating of the pores of highly-ordered mesoporous antiferromagnetic Co_3O_4 replicas with ferrimagnetic $Fe_xCo_{3-x}O_4$ nanolayers

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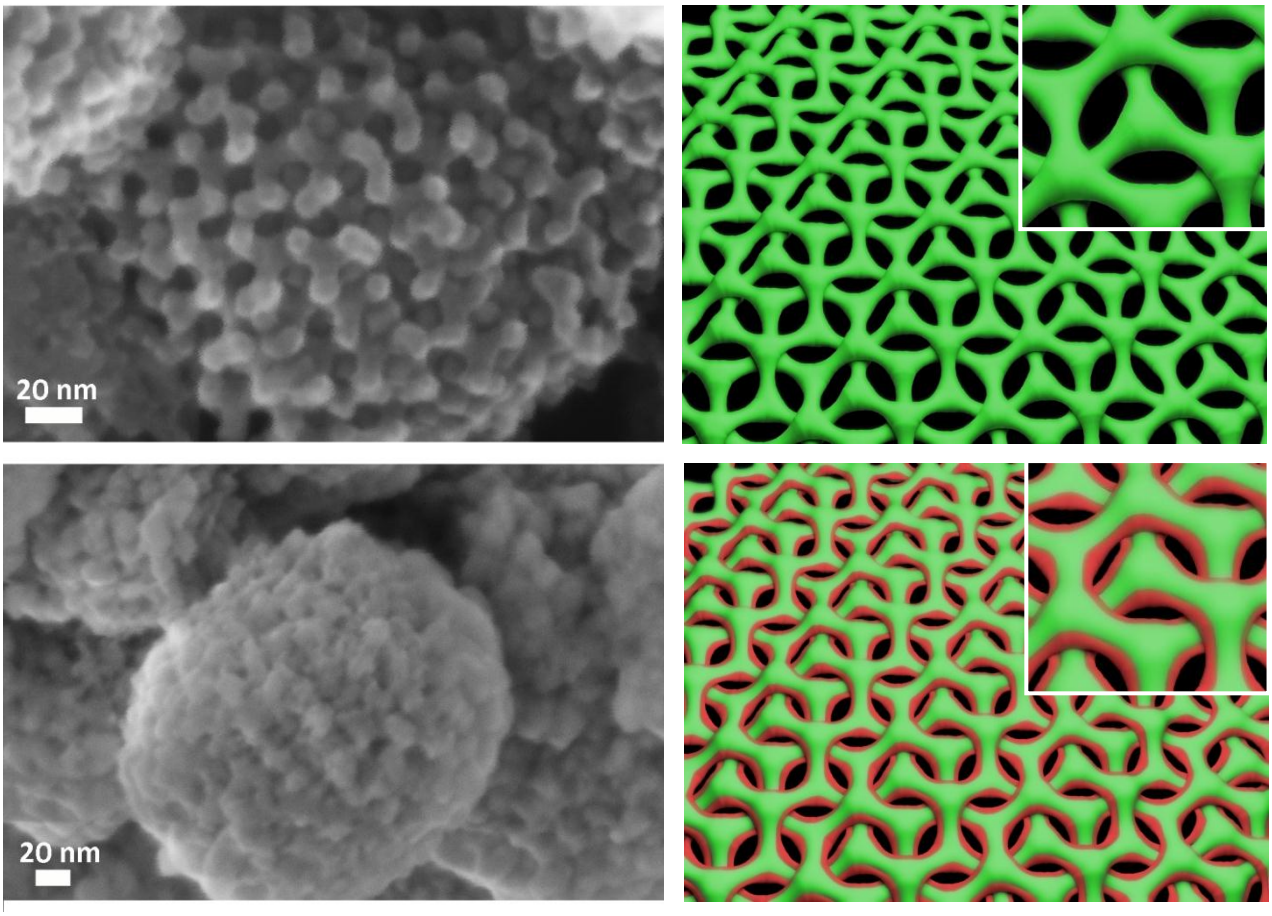

Figure S1 Left: FESEM image of KIT-6 mesoporous particles corresponding to Co_3O_4 template (top) and Co_3O_4-Fe4 sample (bottom) obtained upon infiltration of the Co_3O_4 host with iron nitrate (Fe(III):Co_3O_4 molar ratio of 2.4) followed by calcination. Notice the distinct morphology of the outer surface. Right: Schematic 3D representation of the mesoporous Co_3O_4 template (top, green) and the $Fe_xCo_{3-x}O_4$ (red) coated Co_3O_4 template (bottom). The insets show enlarged views of the corresponding pores.

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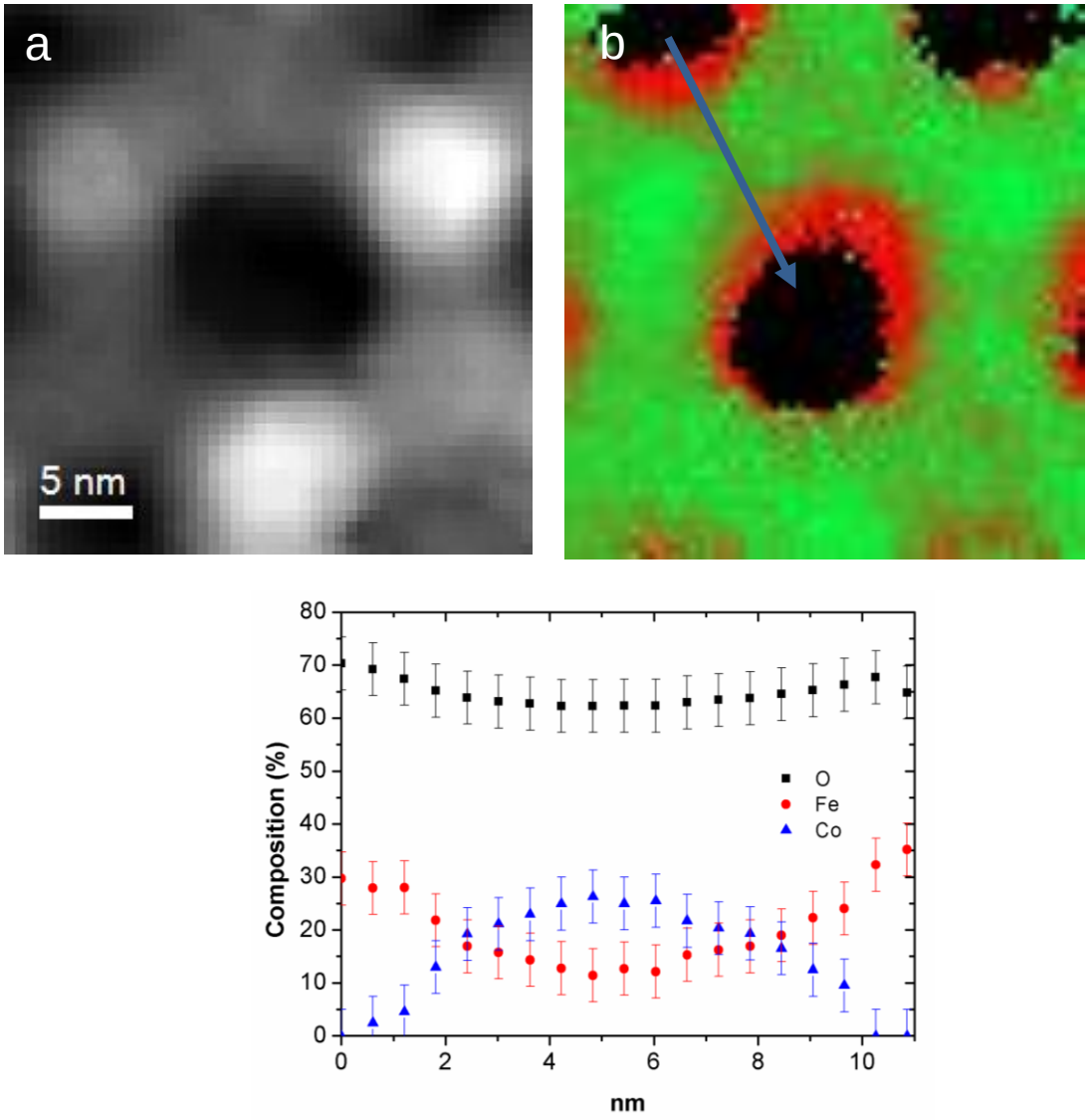

Figure S2 (a) TEM image of a pore of the Co_3O_4-Fe1 particle. (b) EELS map of a) [Co - bright green, Fe -bright red]. (c) EELS relative elemental quantification along the line indicated in in (b).

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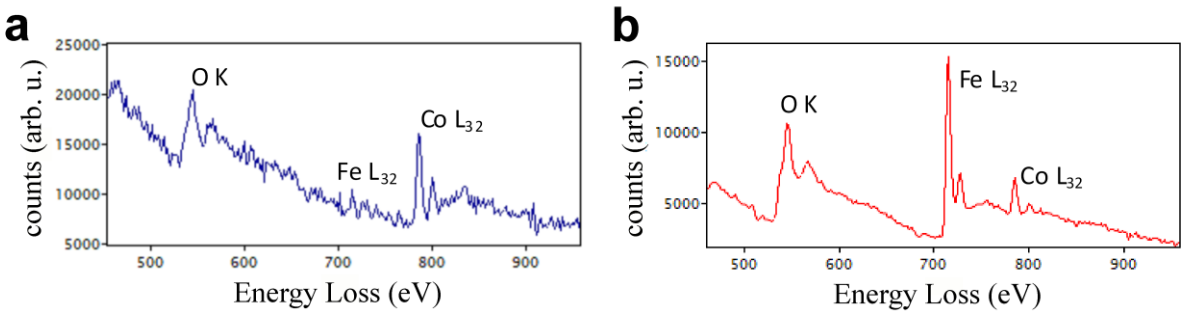

Figure S3. Typical EEL spectra at the pore edge for **a**, Co_3O_4-Fe1 and **b**, Co_3O_4-Fe4 samples.

Sample	Chemical composition $Fe_xCo_{3-x}O_4$
Co_3O_4-Fe1	$0.24 \leq x \leq 1.53$
Co_3O_4-Fe2	$0.66 \leq x \leq 1.72$
Co_3O_4-Fe4	$1.53 \leq x \leq 2.39$
Co_3O_4-Fe6	$0.87 \leq x \leq 1.76$

Table S1. Chemical composition ranges, averaged across several pore walls, of the $Fe_xCo_{3-x}O_4$ nanocoating calculated from individual (i.e., point analysis) EEL spectra, from the inner part towards the edge.

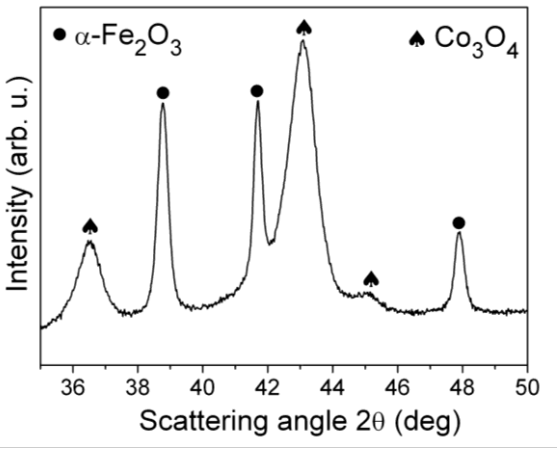

Figure S4. X-ray diffraction pattern in the 35º-50º 2θ region of sample Co_3O_4-Fe6.

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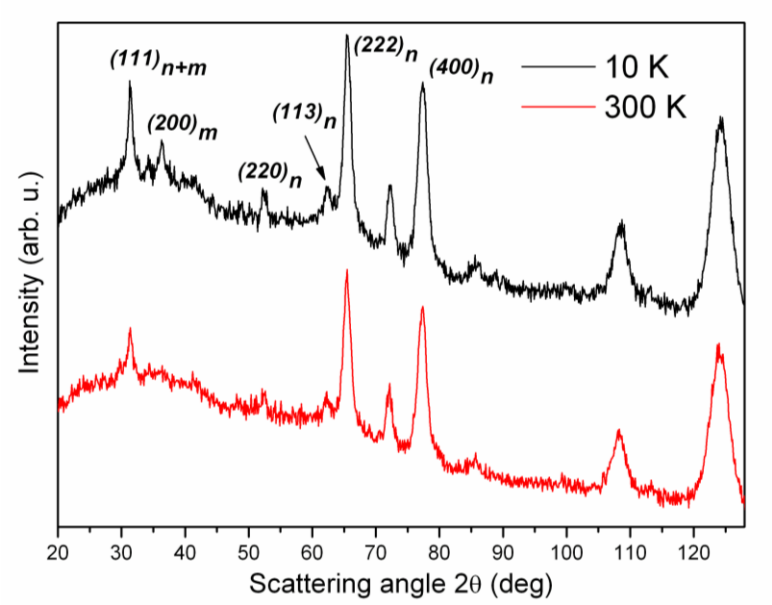

Figure S5. Neutron diffraction patterns measured at 10 K and 300 K for the Co_3O_4 mesoporous template. The main nuclear (*n*) and magnetic (*m*) reflections are indexed in the figure. The peak at $2\theta = 72.25^{o}$ belongs to the (110) reflection of vanadium sample holder.