Supporting Information

Unravelling the Nucleation, Growth, and Faceting of Magnetite-Gold Nanohybrids

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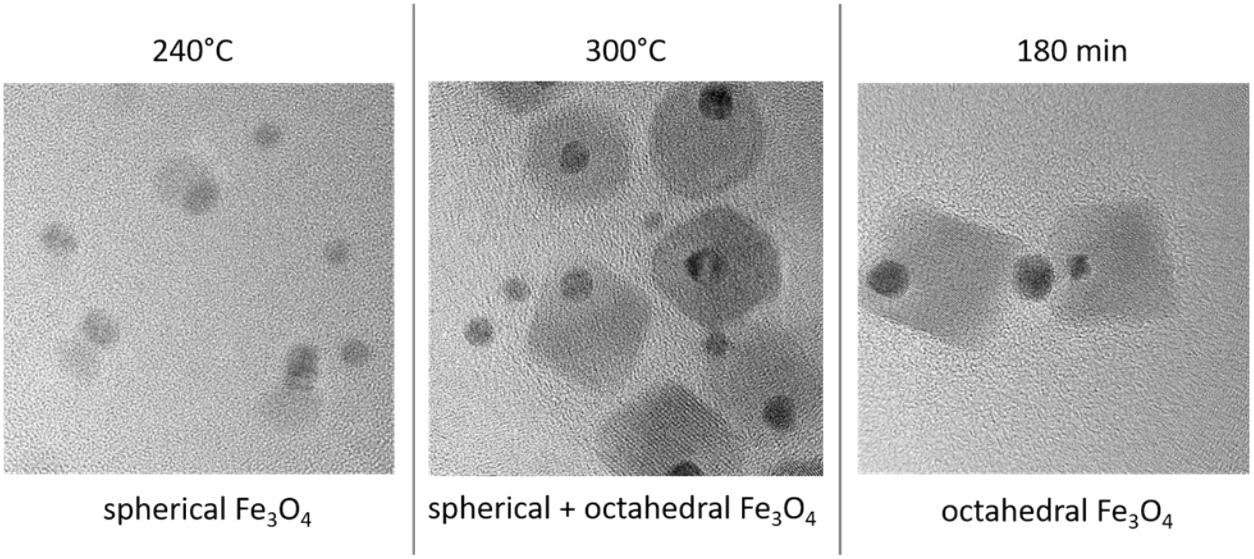

Figure S1 - Bright-field high resolution TEM of Fe_3O_4-Au NPs taken at different stages of the synthesis. In the heating stage, Fe_3O_4 crystallizes (lower contrast than spherical Au NPs) at about 240°C forming spherical motifs. Upon further heating, the NPs grow rapidly and faceting towards truncated octahedra sets in at 300°C while after 180 min reflux time highly crystalline octahedra are found. Total area of all images is 50x50 nm^2

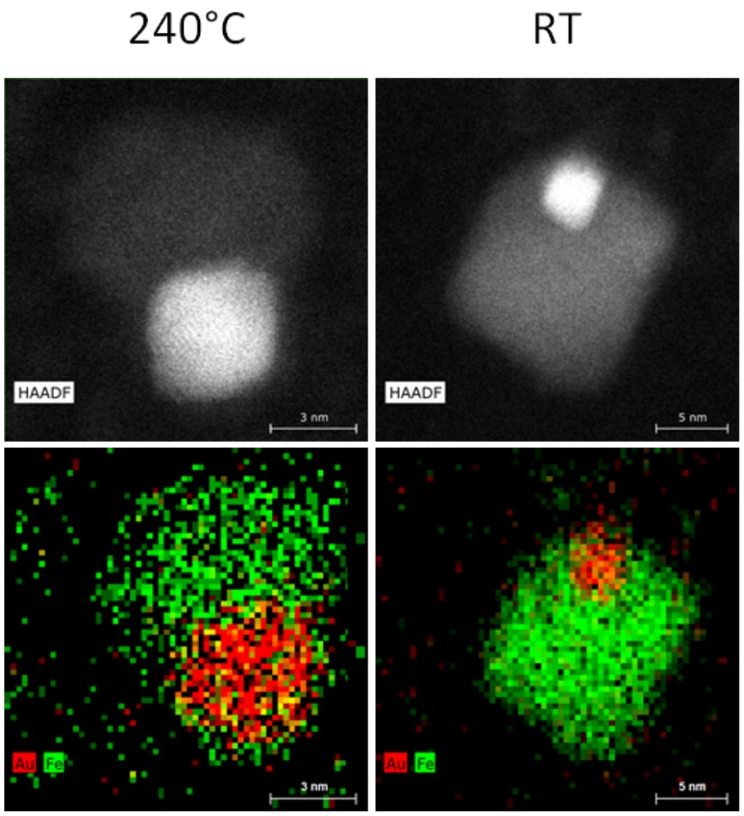

Figure S2 - HAADF-STEM images and EDX elemental maps for the Fe_3O_4-Au NPs probes taken at 240°C and after cooling to room temperature (RT). The EDX maps of Au and Fe are shown in red and green colors, respectively. Scale bars for the 240°C and RT samples are 3 and 5 nm, respectively.

Figure S3 - HAADF-STEM image of multiple-twinned Au NP in the Fe_3O_4-Au hybrid structure for the RT sample.

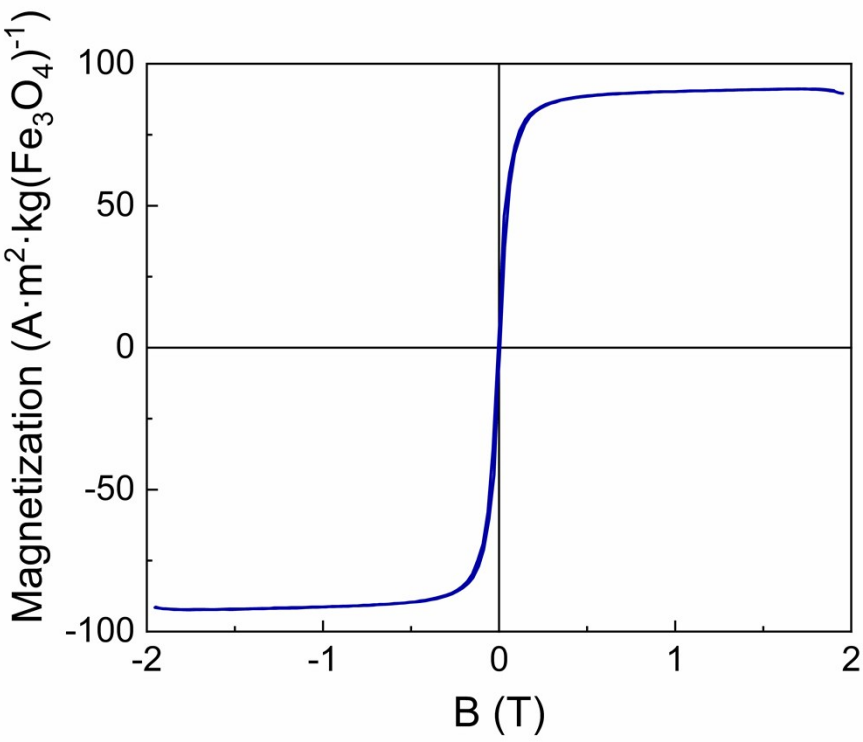

Figure S4 - Hysteresis loop for Fe_3O_4-Au NPs powder (sample PS) measured at room temperature. Magnetization is normalized to the mass fraction of Fe_3O_4.

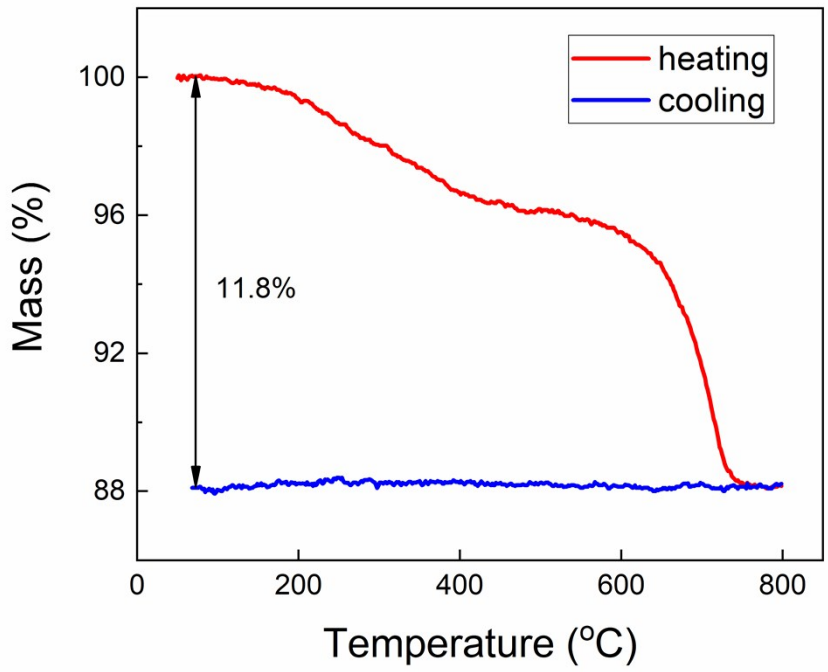

Figure S5 - Mass change of the Fe_3O_4-Au NPs powder (sample PS) during heating to 800°C (red line) and cooling to 30°C (blue line). Heating and cooling rate is 10°C/min.

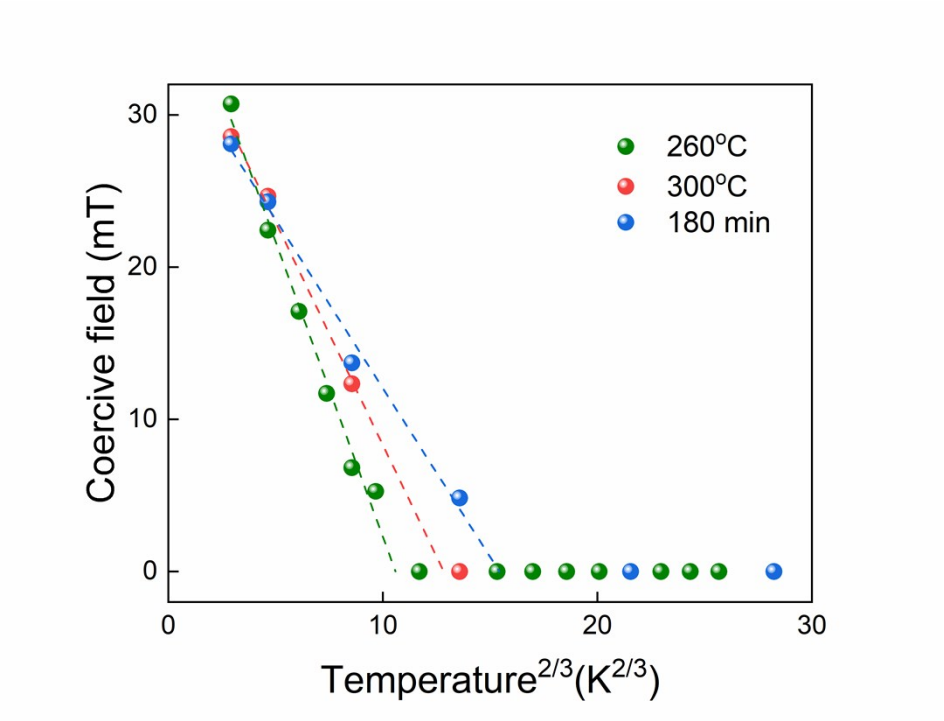

Figure S6 - Coercive field as a function of temperature$^{2/3}$ for Fe_3O_4-Au liquid probes (samples 260°C, 300°C and 180 min) taken from the reaction mixture during synthesis. Fits using Sharrock's equation are shown by the broken lines.

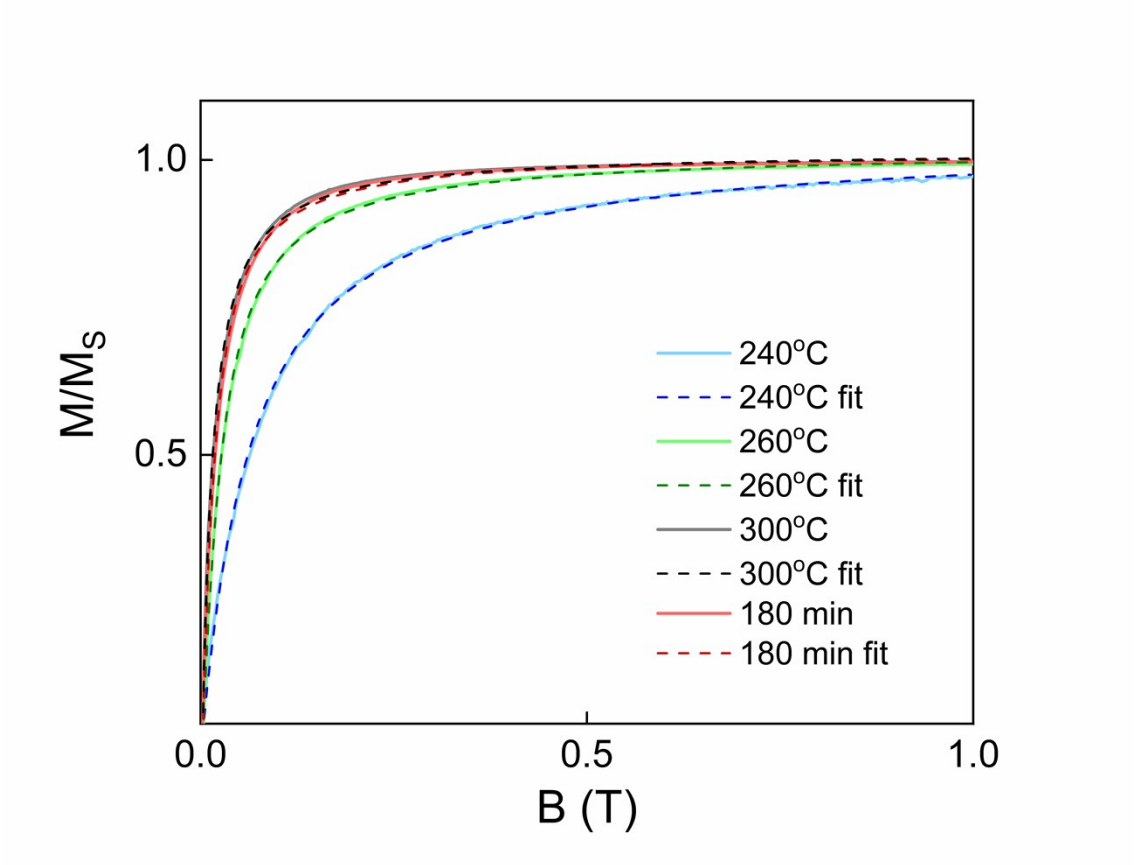

Figure S7 - Magnetization curves in the field region 0 – 1 T measured at 200 K for the probes taken from the reaction mixture at 240°C, 260°C, 300°C and 180 min. The magnetization is normalized to the saturation value. Broken lines are Langevin fits.