

Supplementary information

Deciphering the parameters to produce highly reproducible and scalable Iron Oxide Nanoparticles.

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Fig. S1: Iron oxide nanoparticles when oleic acid concentration was tripled to original protocol

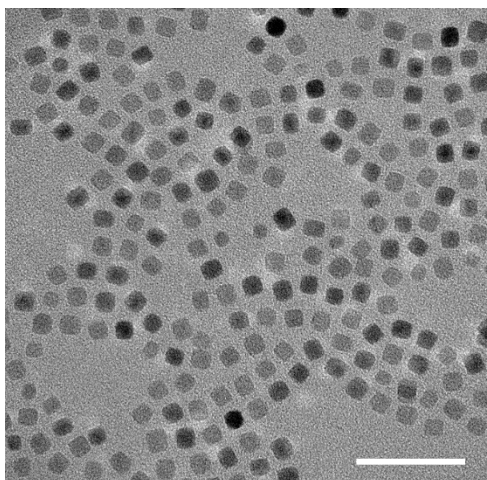


Fig. S2: Iron oxide nanoparticles synthesized at low ramp rate (1°C/min) with different iron oleate concentration

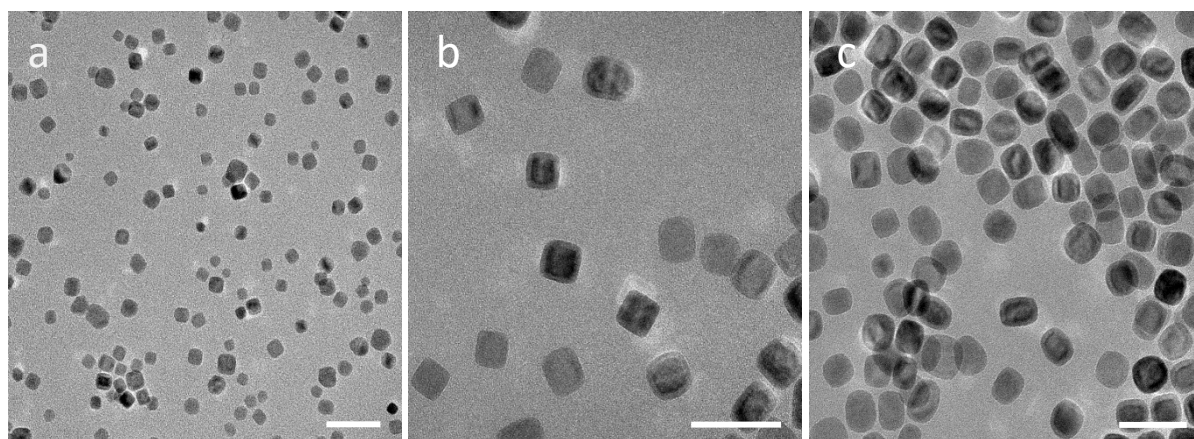


Fig. S3: Iron oxide nanoparticles synthesized at low ramp rate (1°C/min) with higher stirring speed

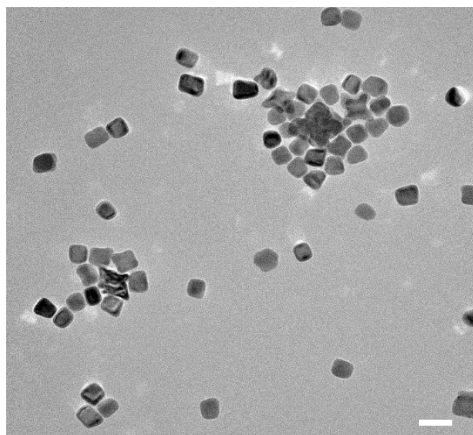


Fig. S4: Iron oxide nanoparticle when synthesized without vacuum cycle

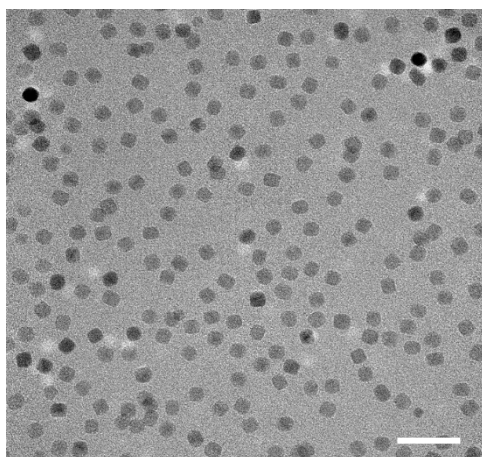


Fig. S5: Iron oxide nanoparticles synthesized at low ramp rate (1°C/min) with hexadecene as solvent at higher stirring speed showing 9.6 ± 0.80 nm NPs

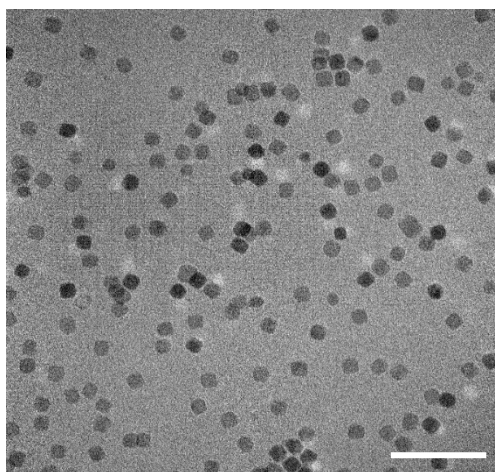


Fig. S6: Iron oxide nanoparticles synthesized with hexadecene as solvent at lower stirring speed showing polydisperse NPs that are difficult to separate

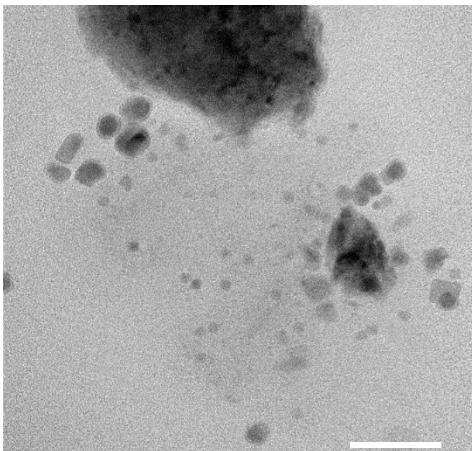


Fig. S7: Iron oxide nanoparticles synthesized with hexadecene scaled up 5x

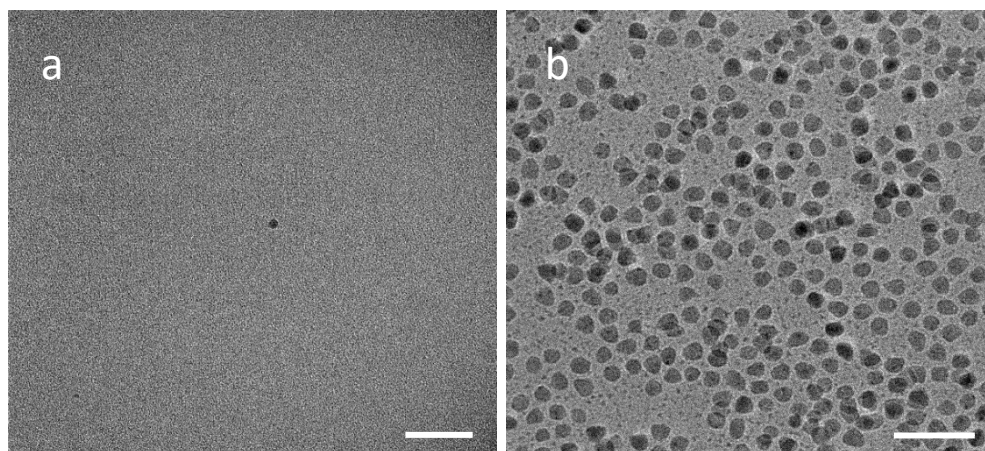


Fig. S8: Iron oxide nanoparticles synthesized in a mixture of benzyl ether and octadecene (1:1)

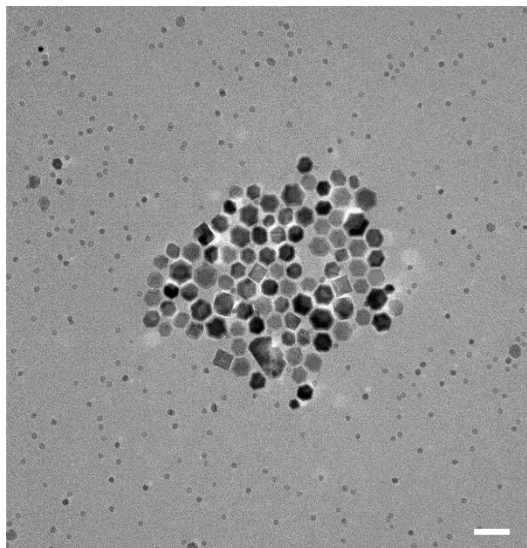


Fig. S9: Iron oxide nanoparticles synthesized with combination of octadecene and benzyl ether along with incorporation of oleyl alcohol at higher stirring speed (~1500 rpm)

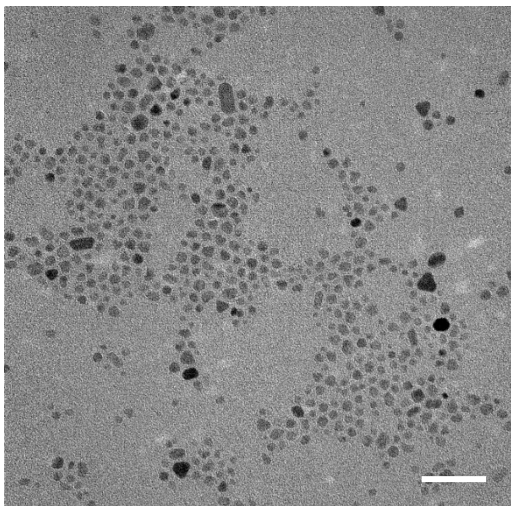


Fig. S10: Reproducibility of iron oxide nanoparticles synthesized with diphenyl ether along with incorporation of oleyl alcohol

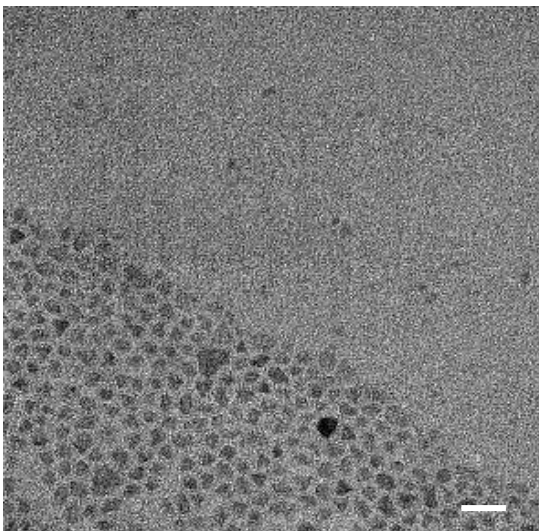


Fig. S11: FTIR of different iron oleates used (Yellow spectra – iron oleate was washed with ethanol instead of water)

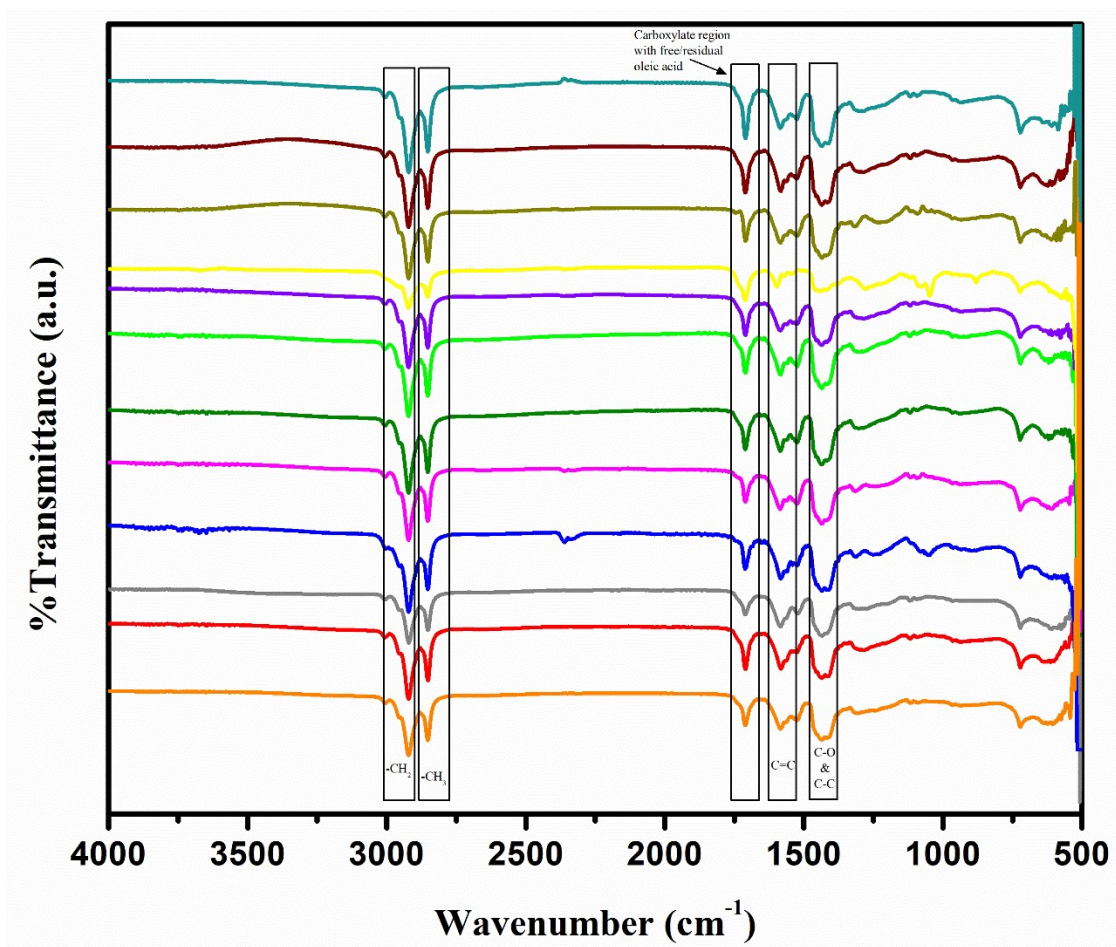


Fig. S12: Aliquots taken at different intervals from iron oleate and octadecene reactions

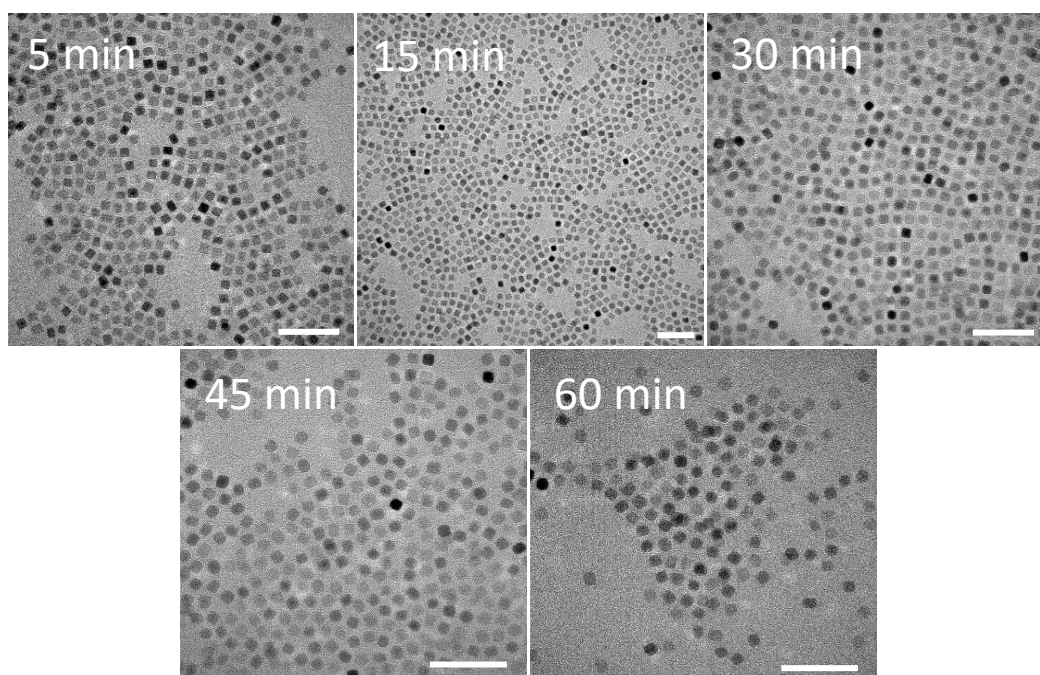


Fig. S13: Aliquots taken at different intervals from iron oleate and hexadecene reactions

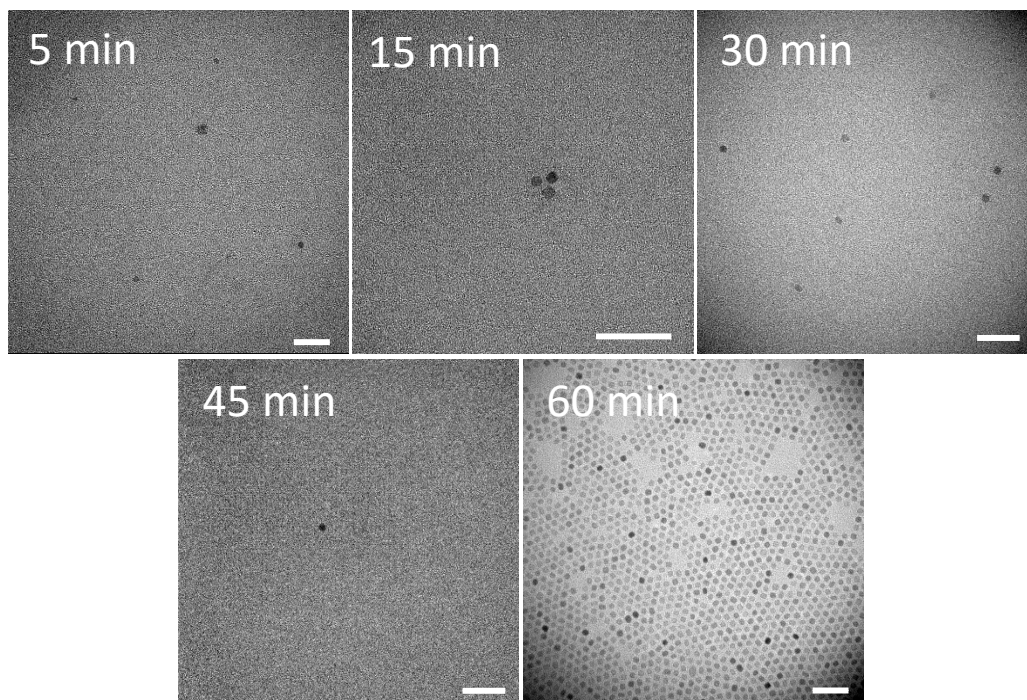


Fig. S14: Reaction conducted with iron oleate and octadecene at 250°C for 4 h

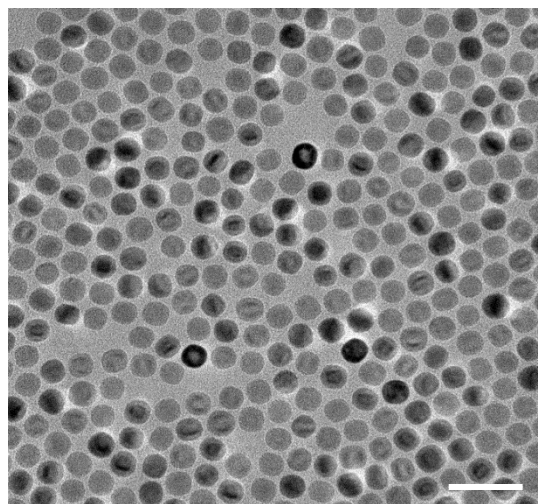


Table S1 Size of nanoparticles from Figure 1

Figure number	Size (nm)
1a	9.8 ± 0.5
1b	9.3 ± 0.8
1c	8.7 ± 0.9
1d	8.6 ± 0.7
1e	9.2 ± 0.7
1f	8.5 ± 0.7
1g	9.0 ± 0.8
1h	11.0 ± 3.0
1i	9.5 ± 1.2
1j	17.7 ± 1.1
1k	17.6 ± 8.8
1l	35.2 ± 6.1
1m	8.4 ± 1.1
1n	9.1 ± 0.9
1o	9.5 ± 1.2
1p	7.1 ± 0.5
1q	11.3 ± 6.2
1r	12.6 ± 7.2
1s	15.2 ± 5.1
1t	18.3 ± 2.8

Table 2 Size of nanoparticles from Figure 2

Figure number	Size (nm)
2a	8.2 ± 0.8
2b	8.2 ± 0.6
2c	7.2 ± 0.4
2d	6.4 ± 0.5
2e	7.2 ± 0.5
2f	7.6 ± 0.7
2g	7.4 ± 0.6
2h	9.2 ± 0.6
2i	7.5 ± 0.4

Table 3 Size of nanoparticles from Figure 3

Figure number	Size (nm)
3a	6.7 ± 1.1
3b	5.3 ± 0.9
3c	18.4 ± 4.7
3d	37.5 ± 5.5
3e	4.4 ± 1.9
3f	4.3 ± 0.5

Table 4 Size of nanoparticles from Figure 4

Figure number	Size (nm)
4a	5.3 ± 1.6
4b	7.8 ± 5.8
4c	4.8 ± 1.4
4d	6.9 ± 2.5
4e	5.7 ± 2.9
4f	8.5 ± 6
4g	3.9 ± 0.5
4h	15 ± 7
4i	4.3 ± 0.7
4j	2.6 ± 0.3
4k	4.5 ± 1.1
4l	4.5 ± 1.3