Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information

The chemically directed assembly of nanoparticle clusters from superparamagnetic iron-oxide nanoparticles

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S1) The XRD pattern of the maghemite nanoparticles

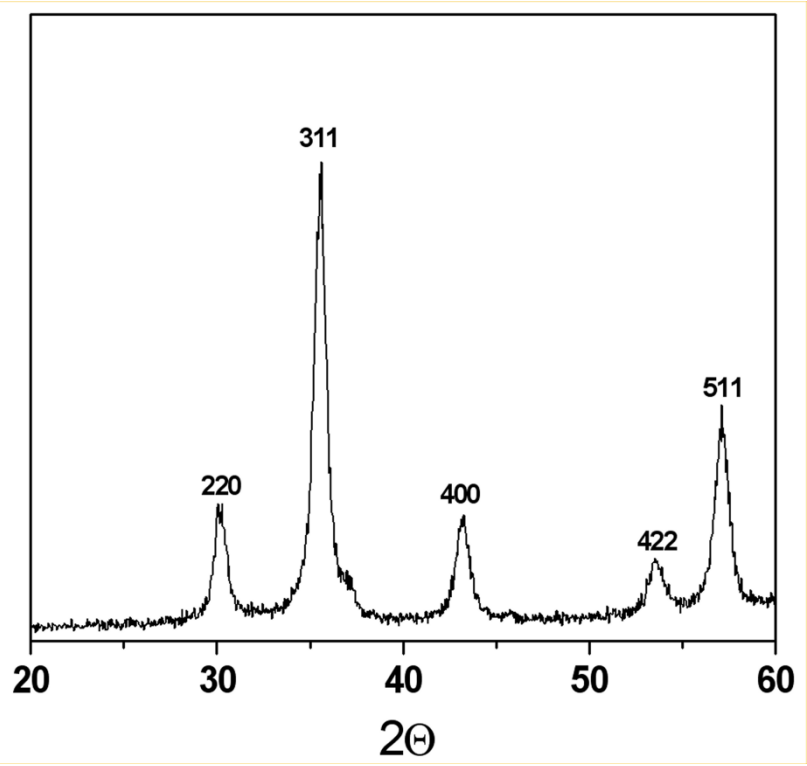

Fig. S1 The XRD pattern of the maghemite nanoparticles.

S2) Carboxyl functionalization of nanoparticles using a follow-up reaction of amine-functionalized nanoparticles with succinic anhydride

For the carboxyl-functionalized nanoparticles (C@NPs), the amine-functionalized nanoparticles (A@NPs) were further reacted with a ring-opening elongation reaction of the surface amines with succinic anhydride (SA) in N,N-dimethylmethanamide (DMF) providing carboxyl functionalization. In brief, 50 mg of the amine-functionalized nanoparticles were dispersed in DMF (35 mL). Some SA (10 mg) dissolved in DMF (15 mL) was slowly added to the suspension, while being rigorously stirred. The reaction mixture was then stirred overnight at room temperature. After aging, the suspension of the carboxyl-functionalized nanoparticles was completely stable. After the completion of the reaction, the mixture was ultra-filtred (30 kDa membrane Millipore, NMWL) to remove all the remaining, non-reacted, reagents from the suspension. Finally, the carboxyl-functionalized nanoparticles were re-dispersed in distilled water.

S3) Additional TEM images of the "raspberry-like" nanoparticle clusters (NCs)

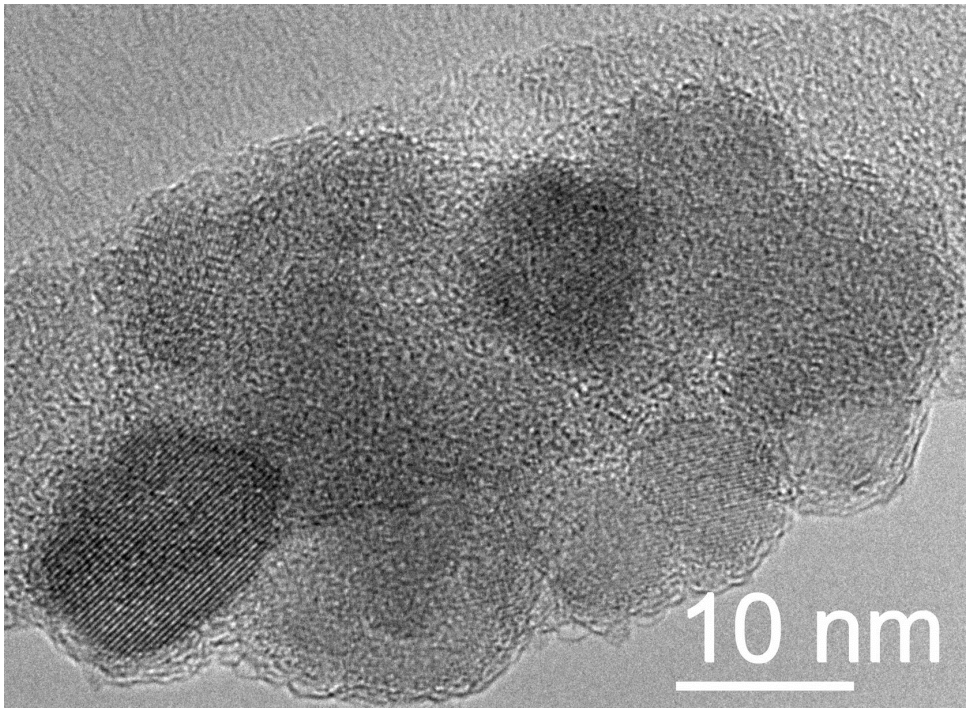

Fig. S2 HRTEM image of the NC.

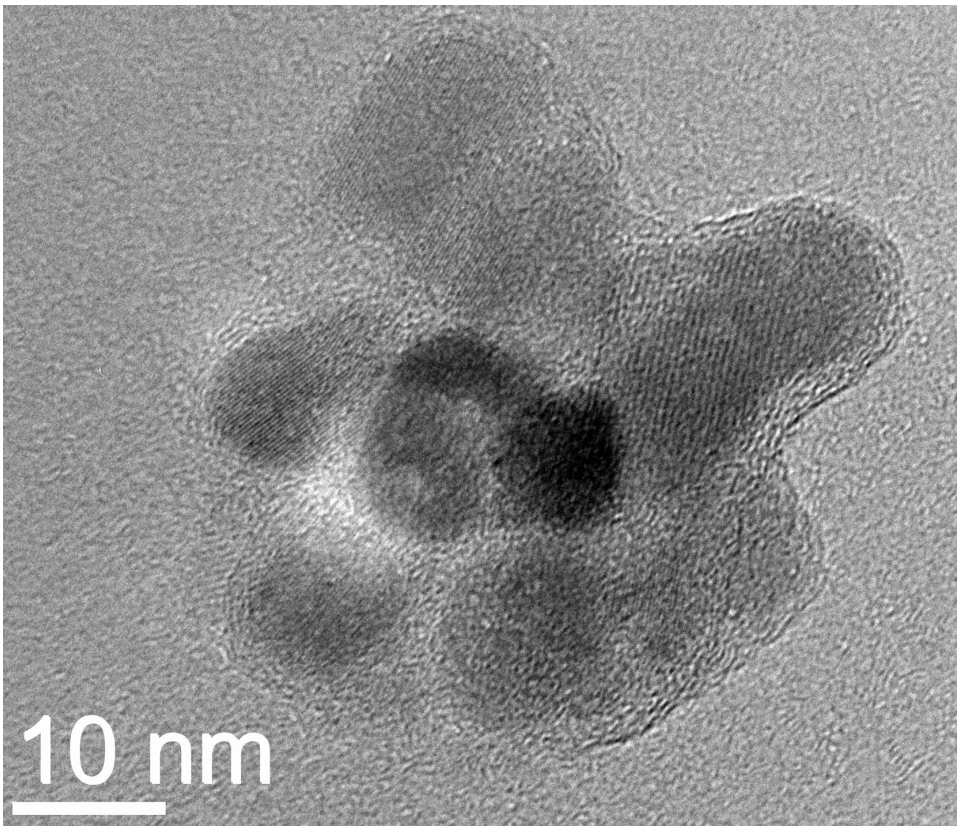

Fig. S3 HRTEM image of the NC.

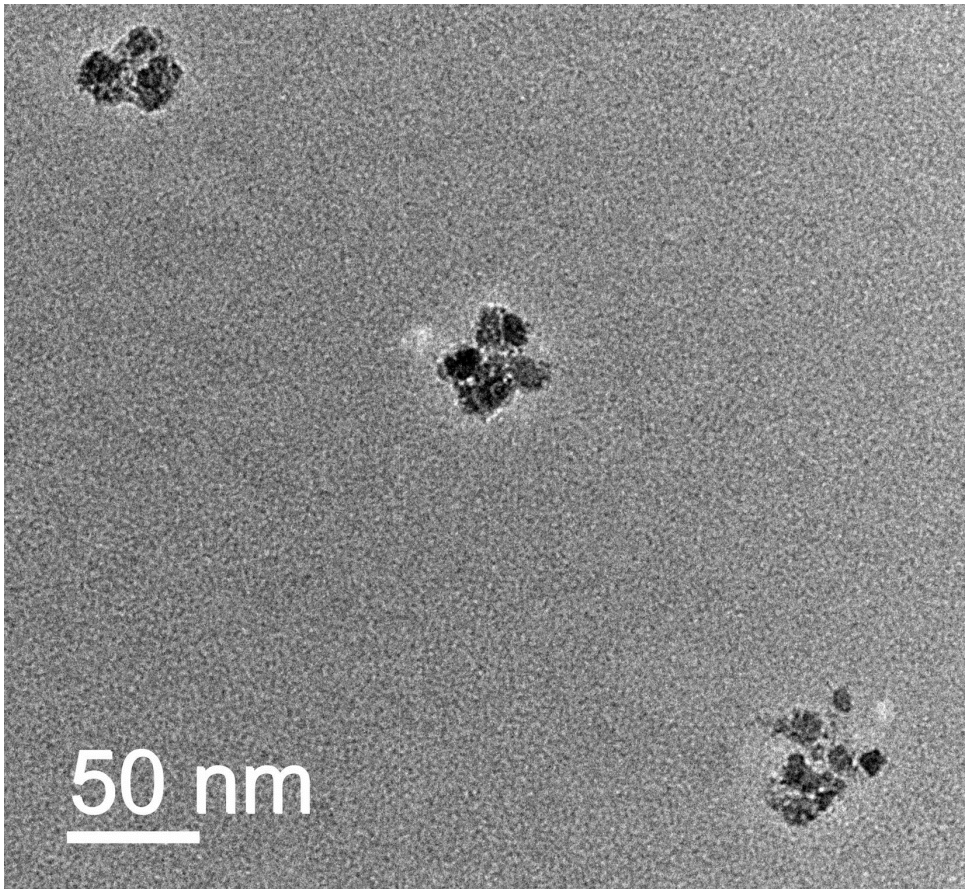

Fig. S4 TEM image of the NCs.

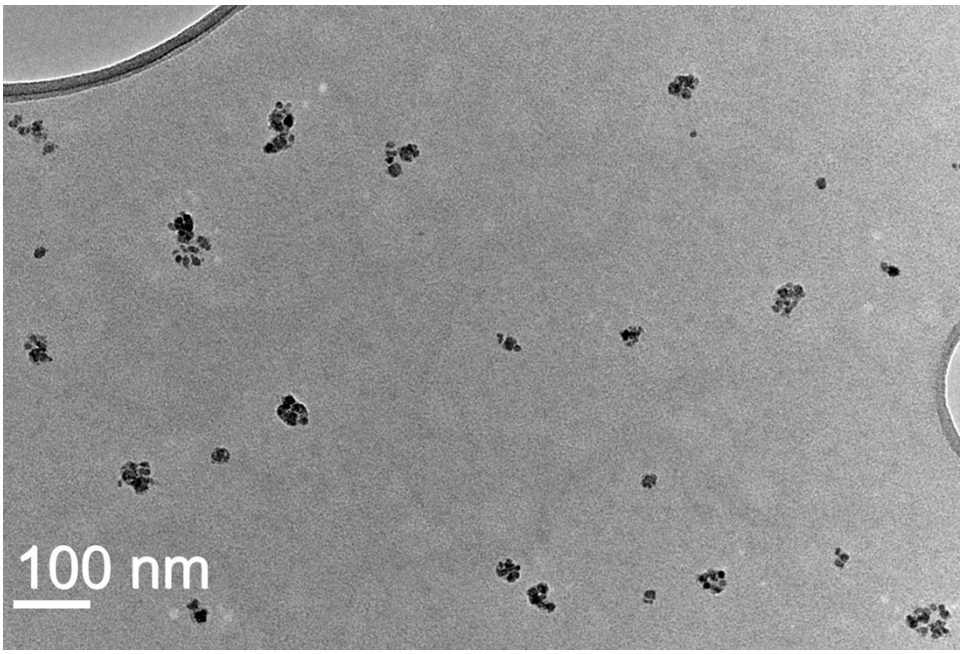

Fig. S5 TEM image of the NCs.

S4) ATR-FTIR spectra of the A@NPs, C@NPs, and NCs.

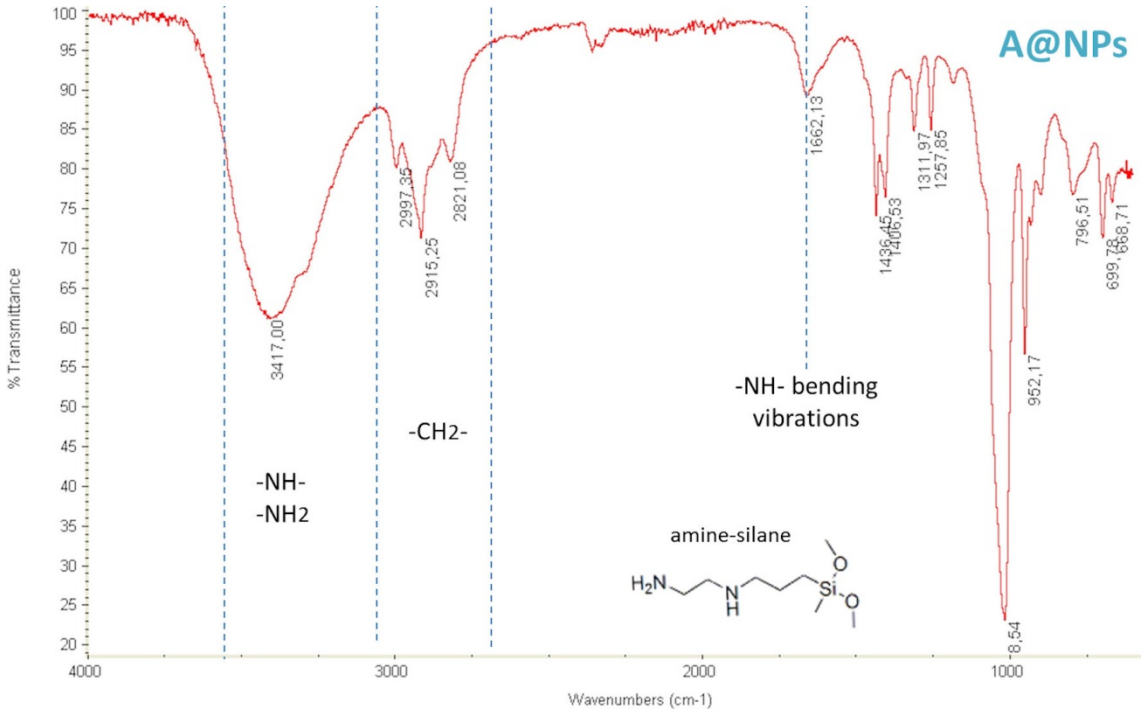

Fig. S6 ATR-FTIR spectrum of the A@NPs.

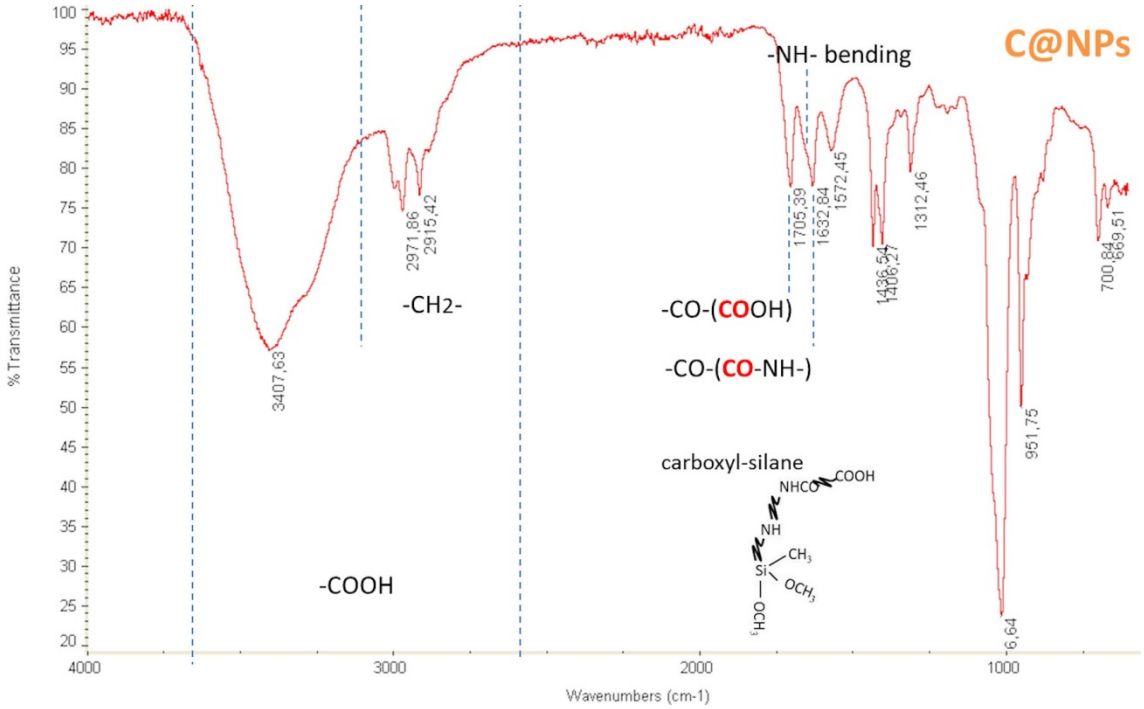

Fig. S7 ATR-FTIR spectrum of the C@NPs.

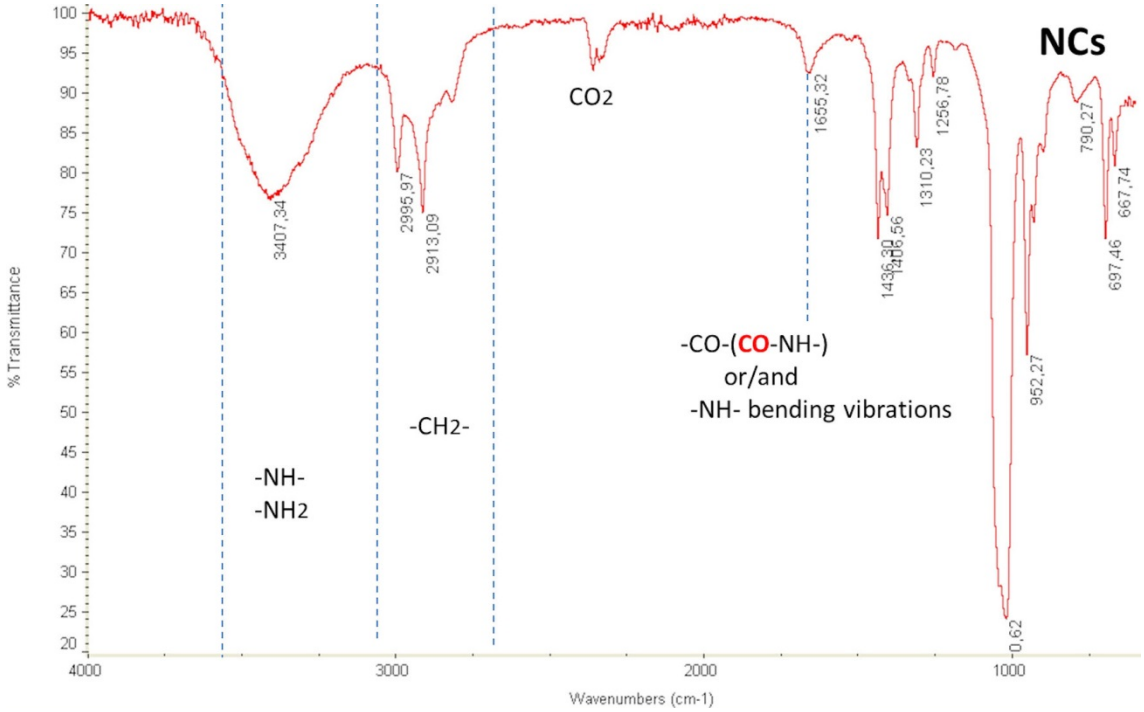

Fig. S8 ATR-FTIR spectrum of the NCs.