

Supplementary Information for
Goethite Nanoparticle Aggregation: Effects of Buffers, Metal Ions,
and 4-Chloronitrobenzene Reduction

Environmental Science: Nano

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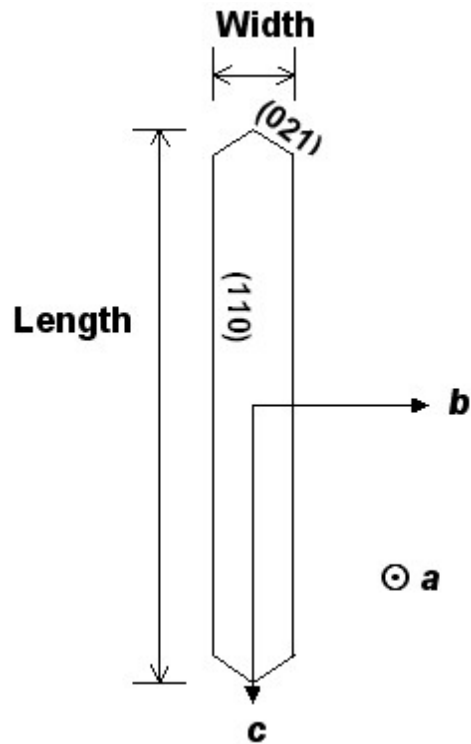


Figure S1. Schematic diagram of goethite nanoparticle

Table S1. Properties of goethite particles

SA_{BET}^1 (m^2/g)	SA_{TEM}^2 (m^2/g)	Width ³ (nm)	Length ³ (nm)
136.8 ± 0.5	218.6 ± 86.4	8.9 ± 3.9	63.7 ± 22.9

¹Surface area measure via nitrogen gas absorption/desorption (BET measurement).

²Surface area calculated from TEM measurements.

³Width and length are defined in Figure S1.

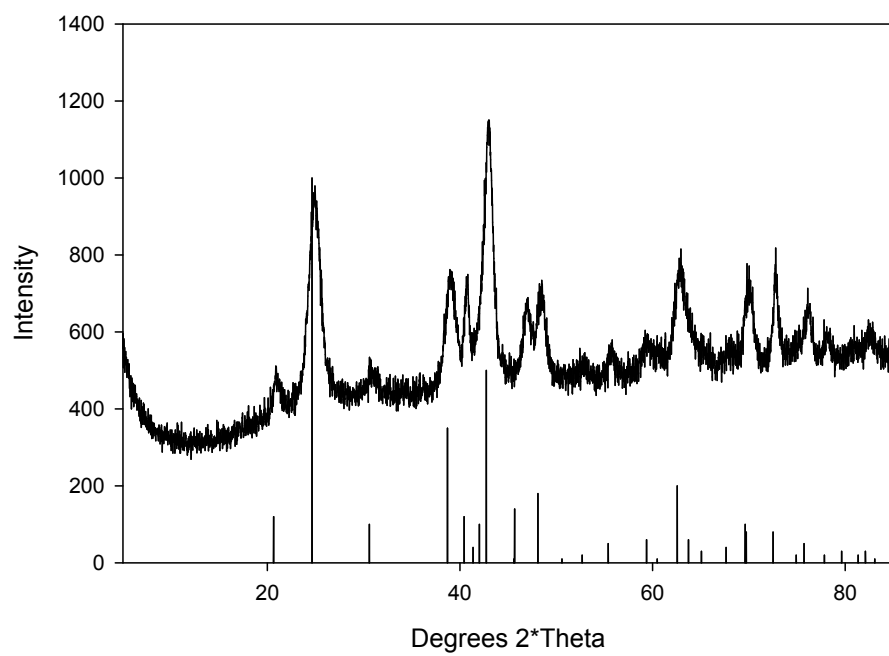


Figure S2. Experimental XRD pattern of goethite nanoparticles with goethite PDF.

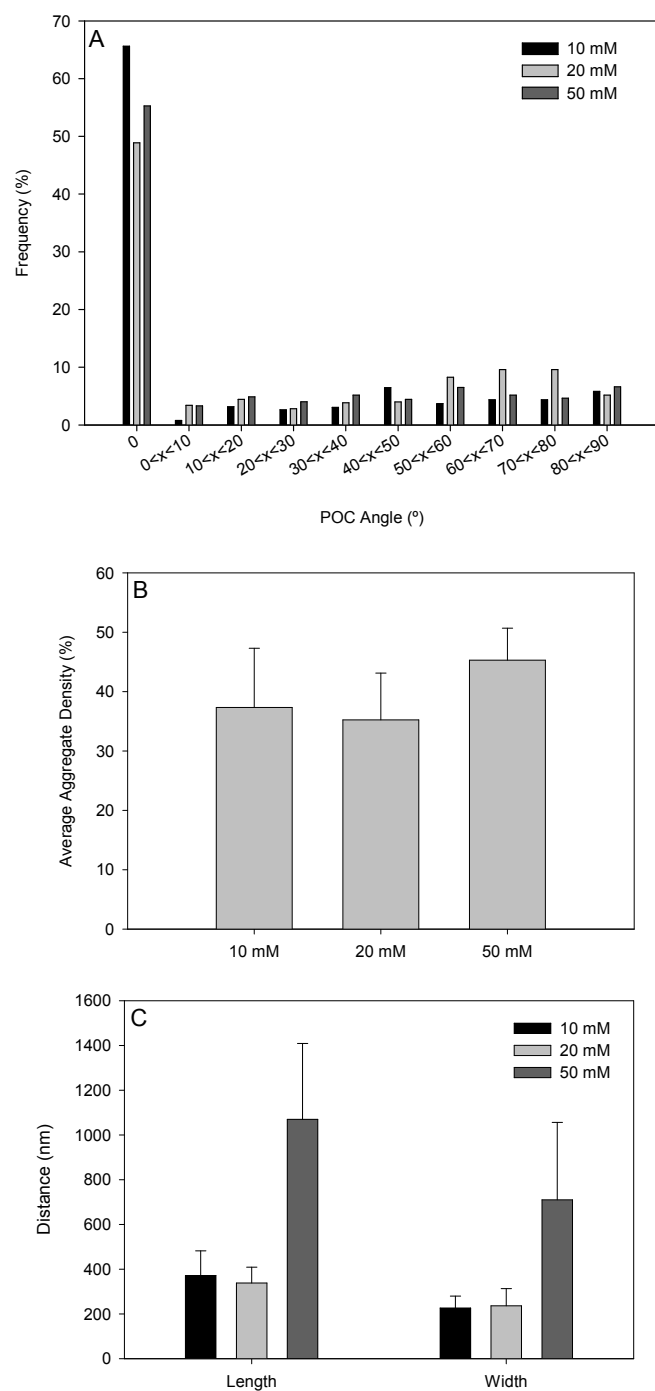


Figure S3. TEM image analysis of goethite nanoparticles suspended in 10, 20, and 50 mM MOPS buffer. Frequency of angles between nanoparticle contacts (A), average aggregate

density (B), and average aggregate length and width (C) were measured for 6 images per concentration.

Table S2. pH of reactors at various MOPS concentration at preparation, after equilibration with the goethite and Fe(II), and after reaction with 4-CINB

MOPS Concentration (mM)	pH after preparation	pH after equilibration	pH after 2 hours reaction with 4-CINB
5	6.84	6.52	6.39
10	6.83	6.73	6.64
20	6.80	6.73	6.69
30	6.79	6.75	6.74
40	6.83	6.77	6.76
50	6.85	6.81	6.79

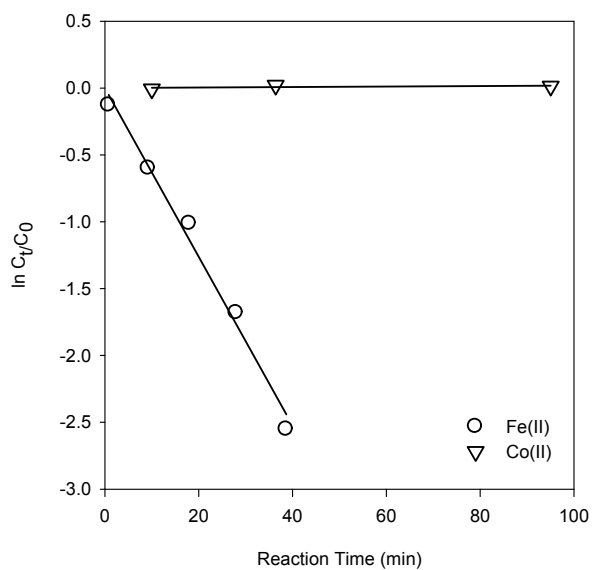


Figure S4: Degradation kinetics of methanolic 4-CINB in the presence of 20 mM MOPS, 1 mM M(II), and 0.325 g/L goethite nanoparticles.

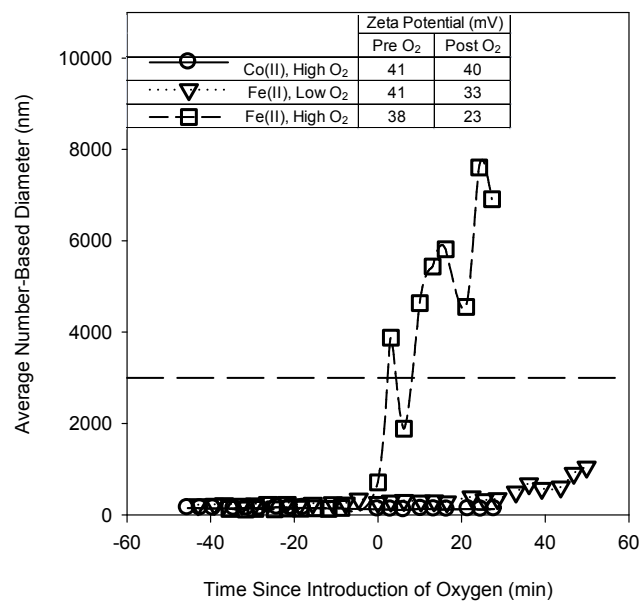


Figure S5: Goethite aggregation kinetics and surface charge measurements before and after the addition of different levels of oxygen. The dashed line at 3000 nm represents the upper quantitative detection limit of the instrumentation.