

1 UNDERSTANDING THE IMPACTS OF SODIUM SILICATE ON WATER QUALITY AND
2 IRON OXIDE PARTICLES

3 ELECTRONIC SUPPLEMENTARY INFORMATION

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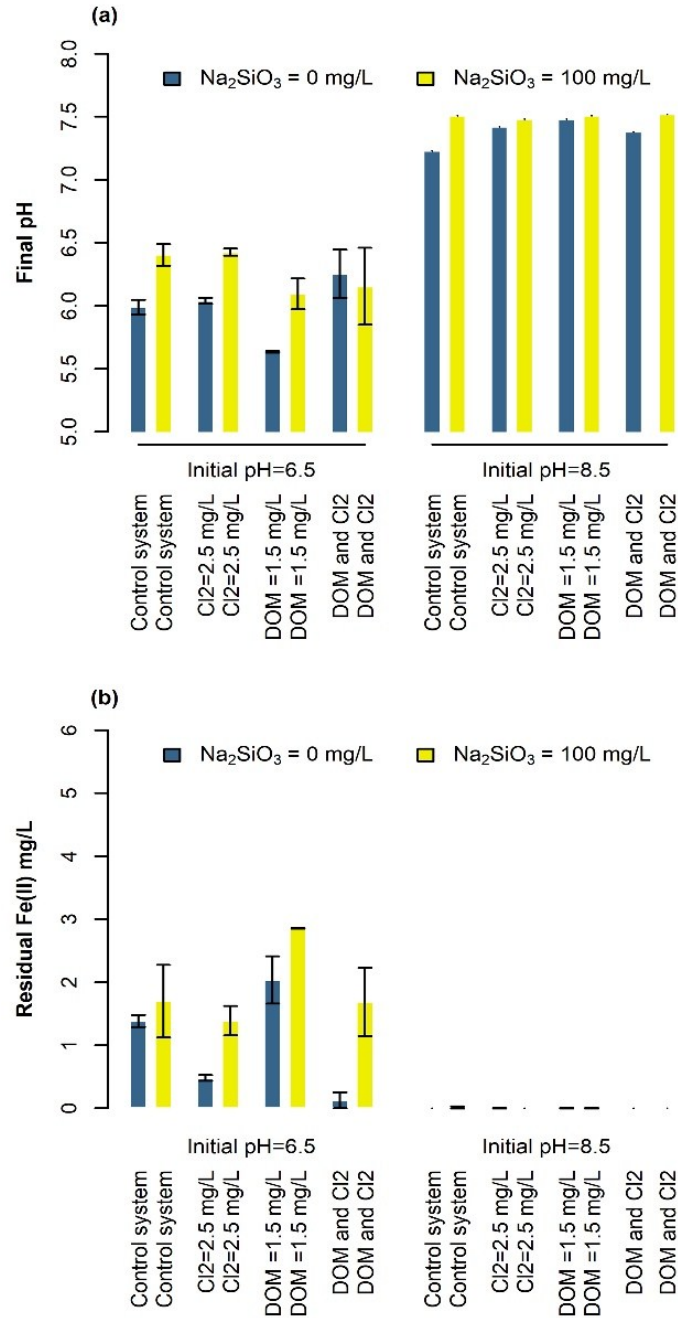
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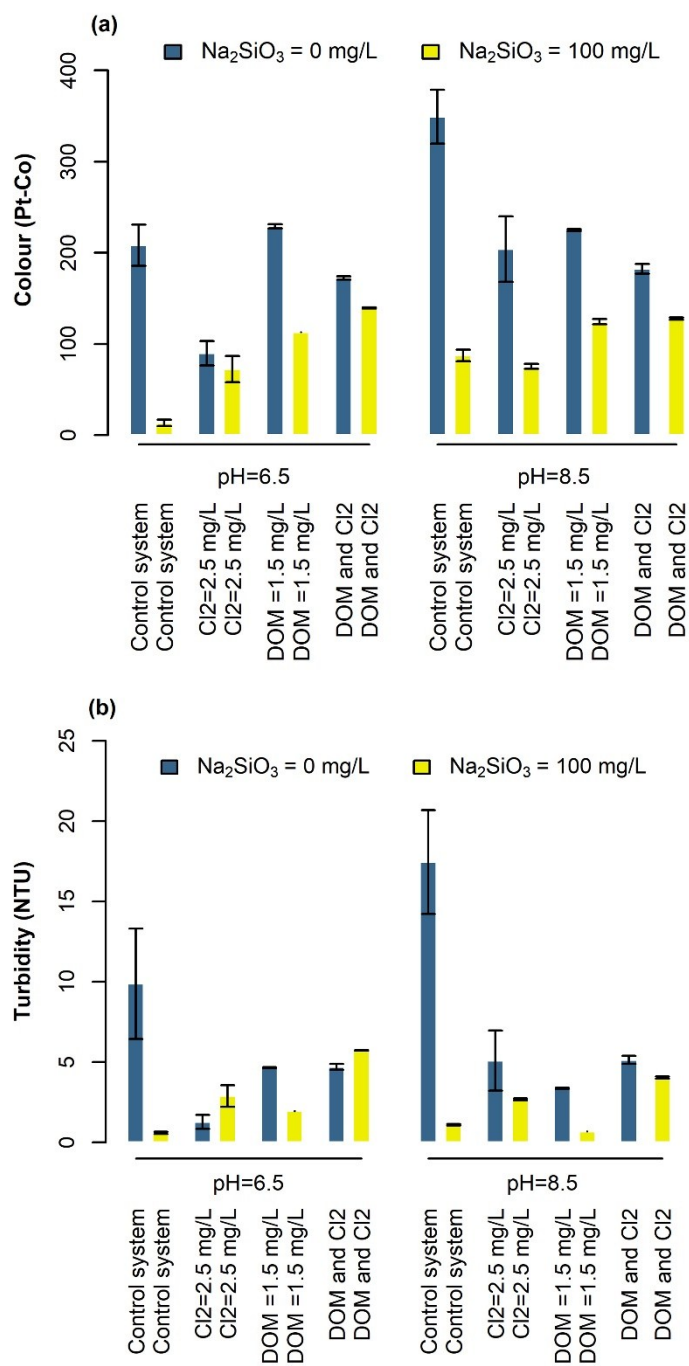
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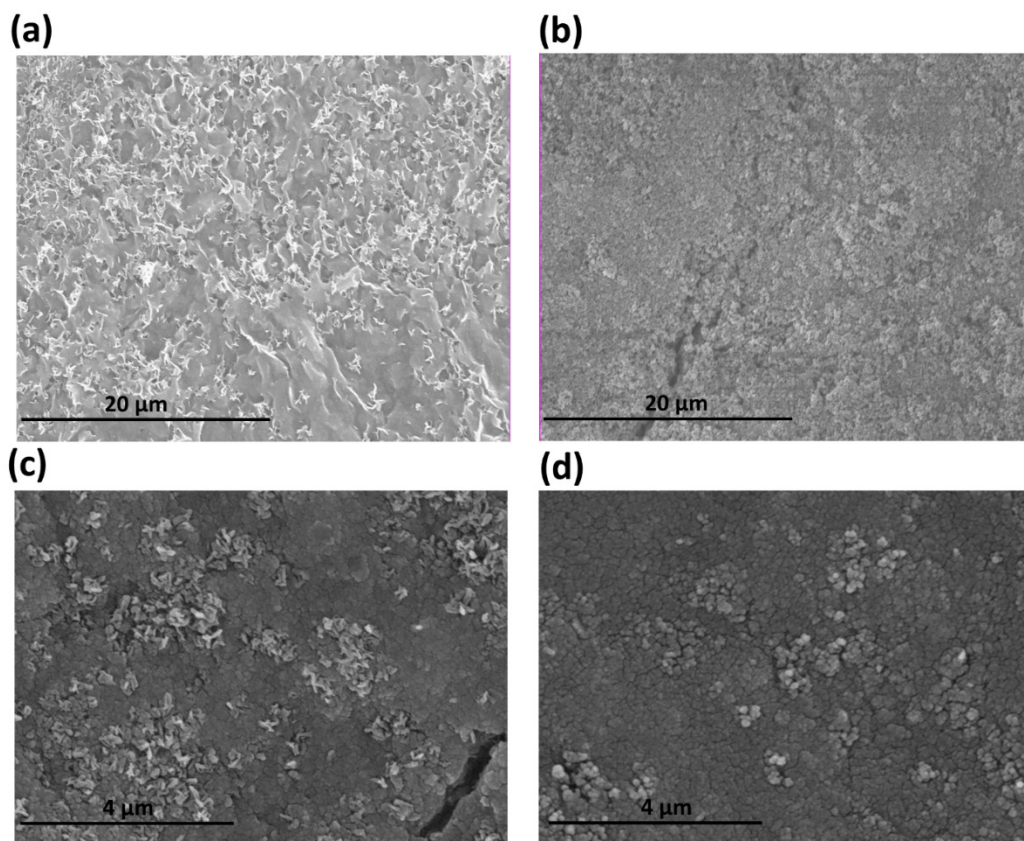
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24 **Figure S1.** Final (a) pH and (b) residual Fe (II) after 3.5 hour of reaction.



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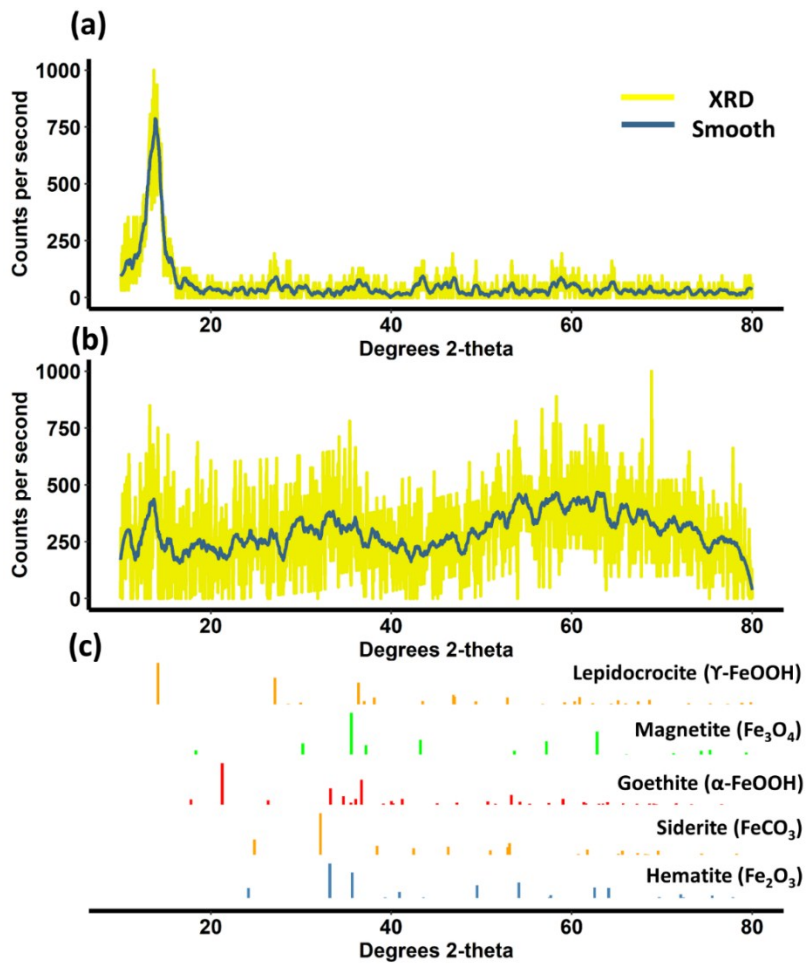
26 **Figure S2.** Effect of sodium silicate on the formation of iron particle suspension (a) colour and
 27 (b) turbidity in NaHCO₃ buffered synthetic water at 21±1°C.



28

29 **Figure S3.** Scanning electron microscopy-energy dispersive X-ray spectroscopies (SEM-EDS)
30 of (a) control system (Fe); (b) system in the presence of sodium silicate (60 mg/L) (Fe-Si); (c)
31 system in the presence of DOM (3 mg TOC/L) and chlorine (2.5 mg/L) (Fe-DOM-Cl₂); and (d)
32 system in the presence of DOM (3 mg TOC/L), chlorine (2.5 mg/L) and sodium silicate (60
33 mg/L) (Fe-DOM-Cl₂-Si).

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36 **Figure S4.** X-ray powder diffraction (XRD) of (a) control system (Fe); (b) system in the
 37 presence of sodium silicate (60 mg/L) (Fe-Si) and (c) XRD standard curves.

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39 Characteristics of Goethite and Magnetite

40 Goethite (FeOOH):

41 Particle size distribution in the range of 0.314-7.64 μm (>1%) using laser diffraction

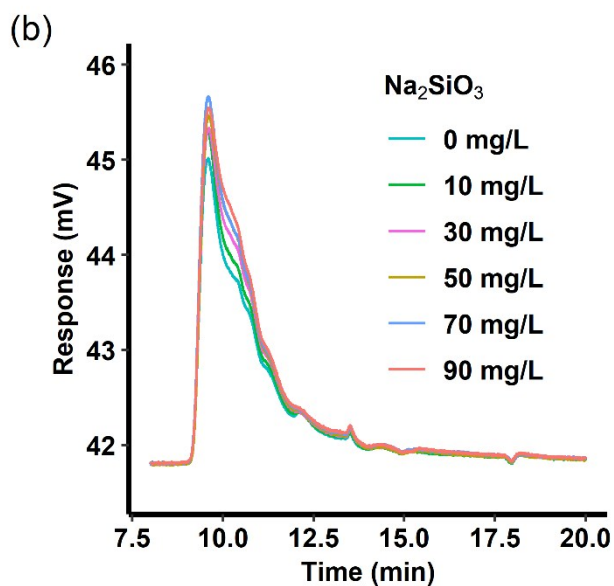
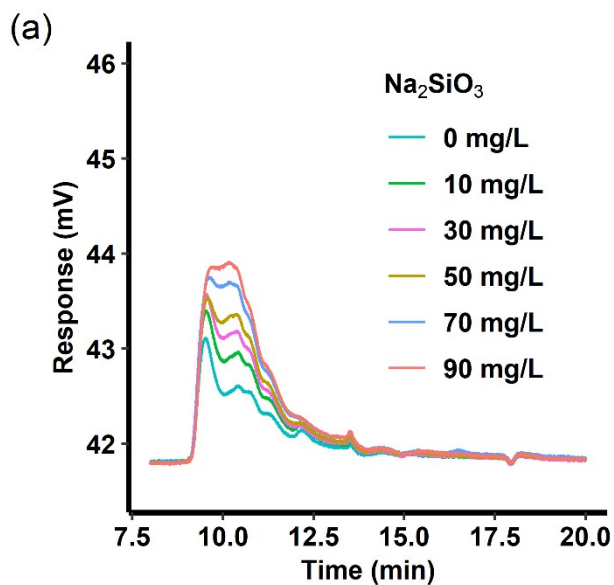
42 Surface area 10.97 m^2/g using BET- N_2

43 Magnetite (Fe_3O_4):

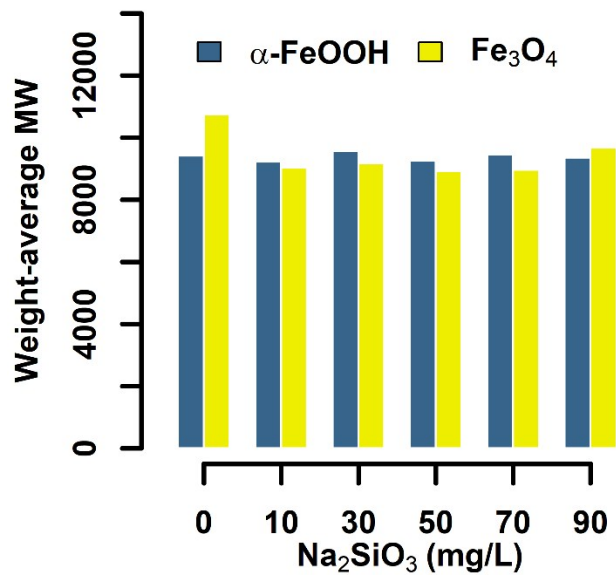
44 Particle size distribution in the range of 0.991-35.3 μm (>1%) using laser diffraction

45 Surface area 6.77 m^2/g using BET- N_2

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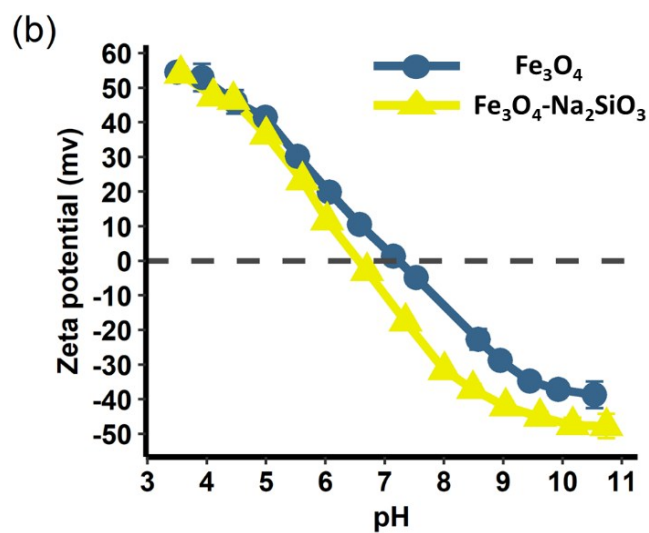
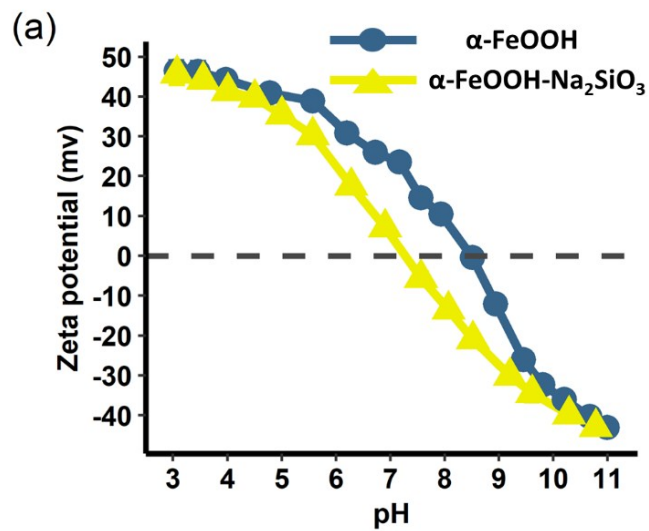
49 **Figure S5.** Molecular weight distribution of residual DOM at sodium silicate dosages of 0-90
50 mg/L with (a) goethite and (b) magnetite using high performance size exclusion chromatography
51 (SEC-HPLC).



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54 **Figure S6.** Weight-average molecular weight of matter in the presence of 0.3 g/L of goethite or
55 magnetite. Data summarized from high performance size exclusion chromatogram results.

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58 **Figure S7.** Effect of sodium silicate (20 mg/L) on the Zeta (ζ -) potential of (a) goethite (0.3
 59 mg/L) and (b) magnetite (0.3 mg/L) at pH 6.5 and $21 \pm 1^\circ\text{C}$ in a 0.01M NaCl solution.

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