

Supplementary Information

Relevance of Colloid Inherent Salt Estimated by Surface Complexation Modeling of Surface Charge Densities for Different Silica Colloids

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Supplementary Information

Table S1. Normalized residuals and pK_a results from surface complexation modeling of potentiometric titration-based surface charge density of 5 wt. % Bindzil 360 colloidal silica in different concentrations of CIS. For these simulations, the Stern layer capacitance and the logarithm of the electrolyte binding constant were fixed at 0.42 F m^{-2} and 0.3 respectively.

CIS for 5 wt.% in mM	Normalized Residuals	Optimized pK_a
0	44.39	5.78
5	18.64	5.98
10	9.50	6.21
20	2.84	6.36
30	1.56	6.44
36	1.16	6.56
38	1.07	6.58
40	1.00	6.61
42	1.02	6.62
44	1.06	6.63
48	1.30	6.66
50	1.52	6.67
60	2.34	6.82
70	3.29	6.85
80	4.52	6.92
100	6.97	7.01

Table S2. Predicted pK_a results from surface complexation modeling of potentiometric titration-based surface charge density of different 5 wt. % silicas with optimum concentrations of CIS. For these simulations, Stern layer capacitance and the logarithm of the electrolyte binding constant were fixed at 0.42 F m^{-2} and 0.3, respectively.

Sample	Specific surface area (m^2/g)	Optimum CIS (mM)	Best fit pK_a
Bindzil 360	360	40	6.61
Ludox SM	345	36	6.74
Klebosol 300	300	24	6.08

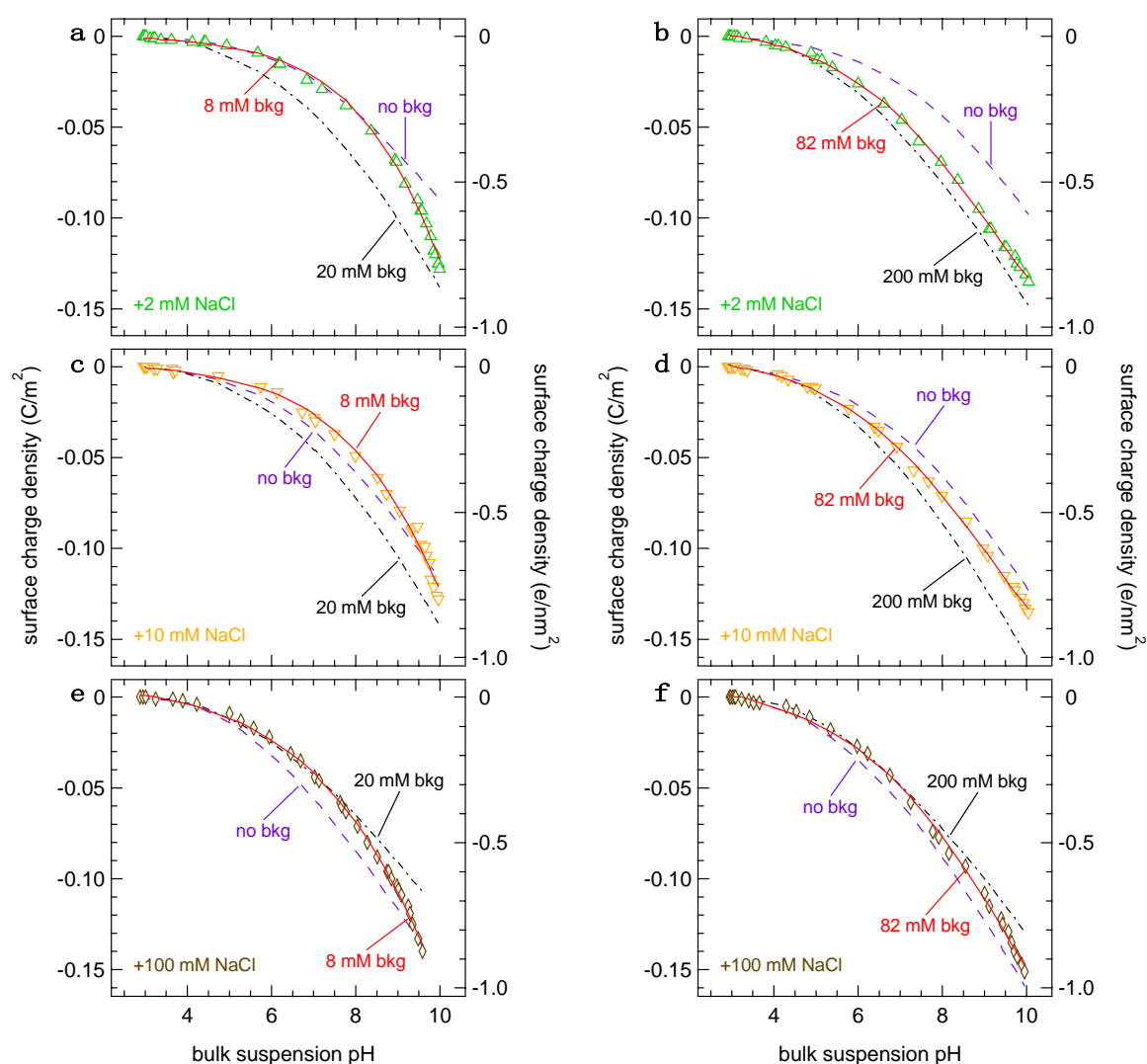


Figure. S1. (a,c,e) SCD for 1 wt. % and (b,d,f) 10 wt. % Bindzil 360 in different amounts of added salt. SCM fits with varying background compared to the SCD in (a,b), 2 mM NaCl (c,d) 10 mM NaCl and (e,f) 100 mM NaCl. For all these simulations the logarithm of the electrolyte binding constant was fixed at 0.3. The Stern layer capacitances for 1 wt. % samples (i.e., a, c, e) and 10 wt. % samples (i.e., b, d, f) were fixed at 0.42 F m^{-2} and was 0.51 F m^{-2} , respectively.

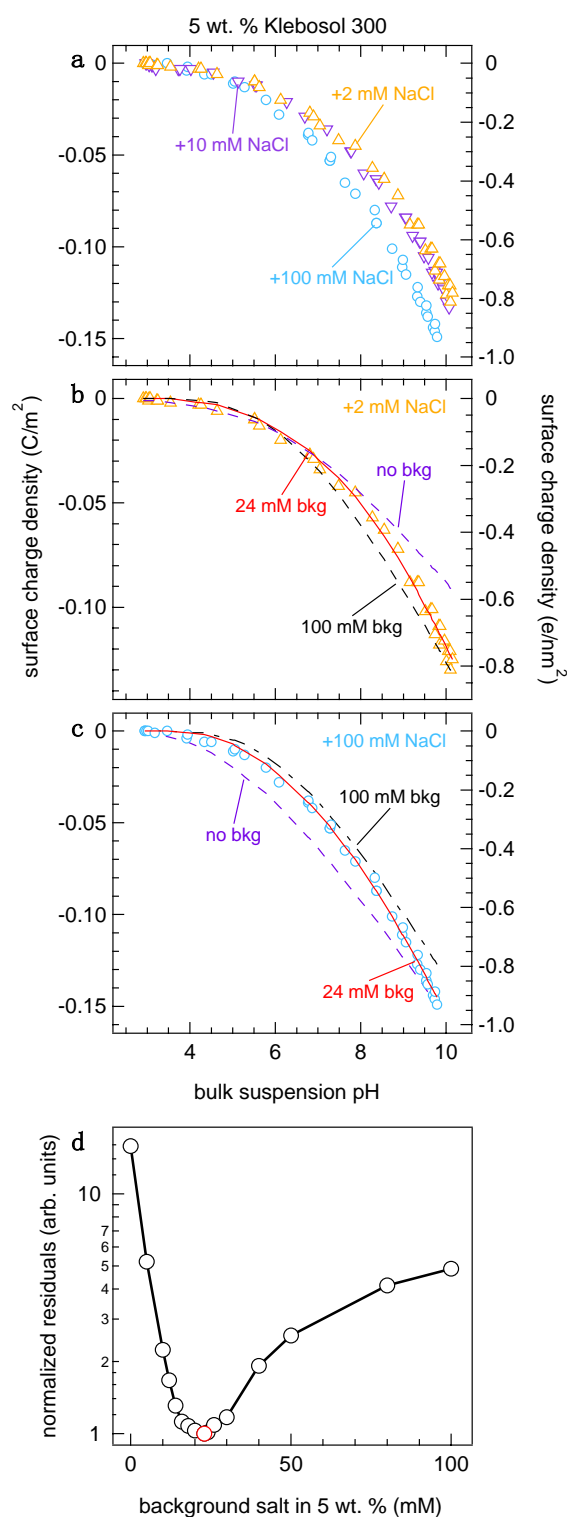


Figure. S2. (a) SCD for 5 wt. % Klebosol 300 in different amounts of added salt. SCM fits with varying background compared to the SCD in (b) 2 mM NaCl (c) 100 mM NaCl. (d) Goodness of fit (residuals) as a function of different amounts of CIS (mM). For these simulations, the Stern layer capacitance and the logarithm of the electrolyte binding constant were fixed at 0.42 F m⁻² and 0.3, respectively.

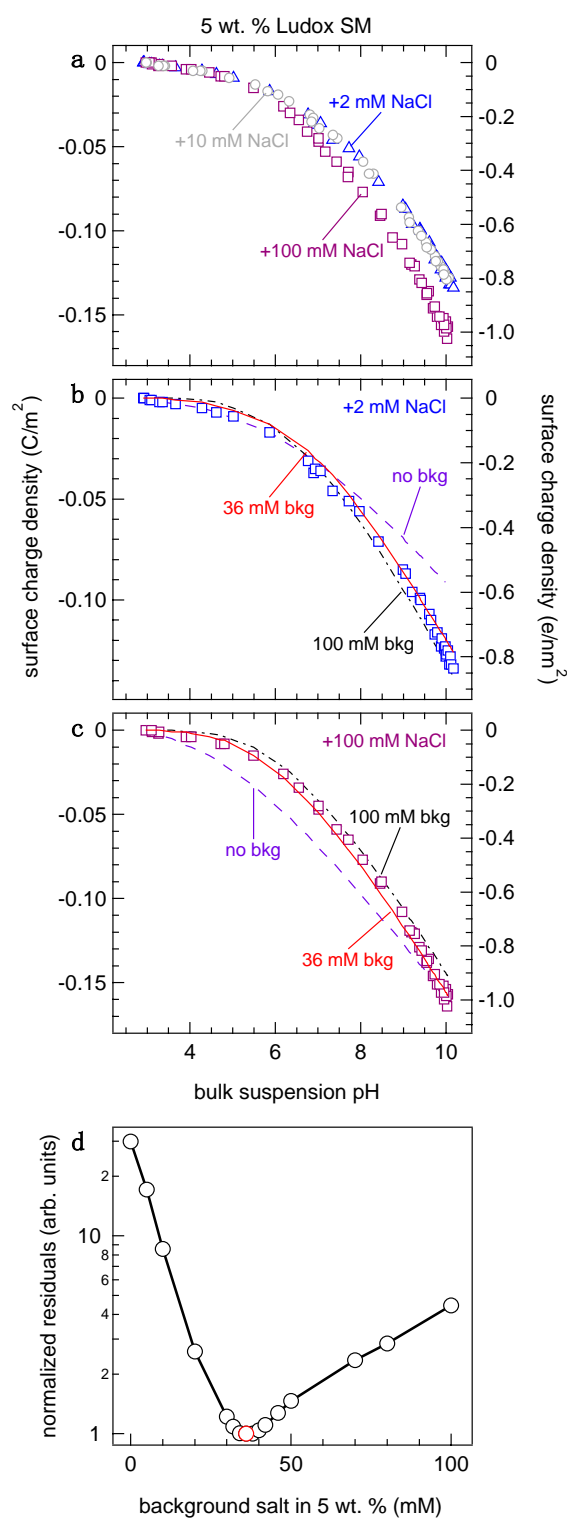


Figure. S3. (a) SCD for 5 wt. % Ludox SM in different amounts of added salt. SCM fits with varying background compared to the SCD in (b) 2 mM NaCl (c) 100 mM NaCl. (d) Goodness of fit (residuals) as a function of different amounts of CIS (mM). For these simulations, the Stern layer capacitance and the logarithm of the electrolyte binding constant were fixed at 0.42 F m⁻² and 0.3, respectively.