



*Supplement of*

## **Effect of colloidal particle size on physicochemical properties and aggregation behaviors of two alkaline soils**

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**Table S1** Centrifugation time and speed for extraction of soil colloidal particles

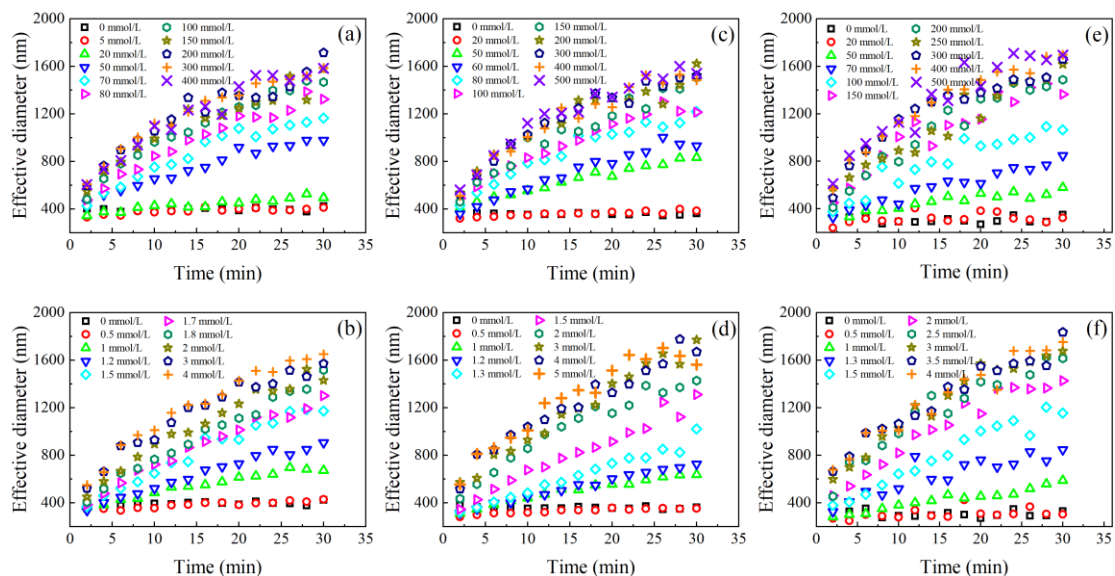
Particle diameter	Centrifugation speed (r·min <sup>-1</sup> )	Centrifugation time (min)
$d < 2 \mu\text{m}$	600	6.28
$d < 1 \mu\text{m}$	1200	6.28
$d < 100 \text{ nm}$	9500	10.03

**Table S2** The oxygen functions of soil colloids

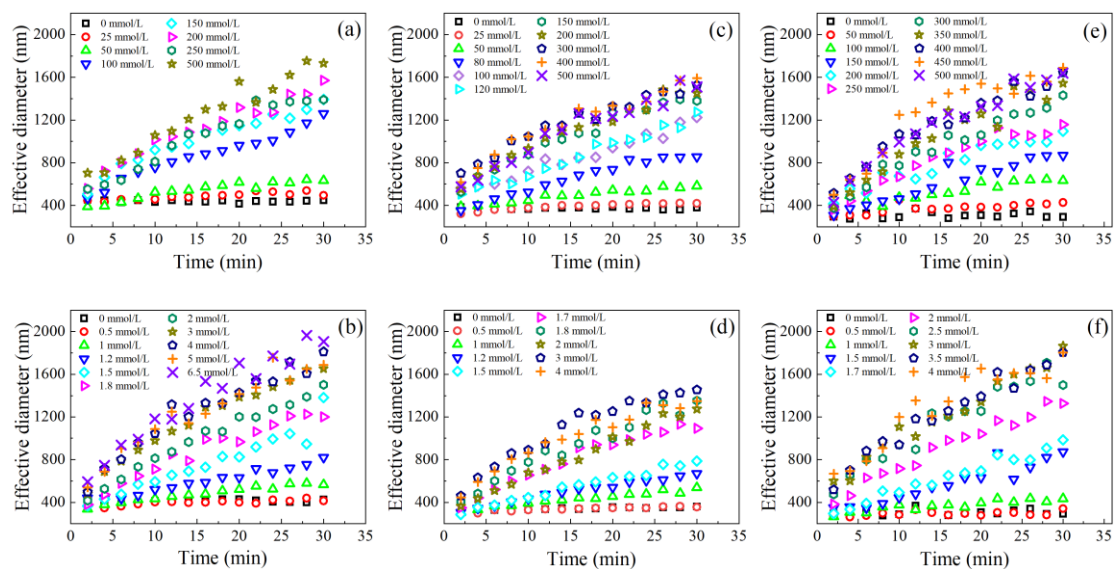
Soil type	Particle diameter	Contents of carbon-containing organic functional groups (%)				Photoelectron spectra peak area of organic functional groups containing carbon (XPS. eV)			
		C–C	C–H	C–O	C=O	COO-	C–C	C–H	C–O
Anthrosol	$d < 2 \mu\text{m}$	67.99	21.06	0	10.95	51785	16160	0	8398
	$d < 1 \mu\text{m}$	77.80	13.00	2.65	6.55	57865	9668	1968	4880
	$d < 100 \text{ nm}$	79.07	2.11	18.82	0	128893	3433	30595	0
Calcisol	$d < 2 \mu\text{m}$	94.75	0	0	5.25	96519	0	0	5335
	$d < 1 \mu\text{m}$	95.09	0	2.84	2.07	90071	0	2687	1945
	$d < 100 \text{ nm}$	79.80	10.67	0	9.53	117936	15743	0	14043

**Table S3** The concentrations of soluble cations in soil colloidal suspension

Soil type	Particle diameter	K <sup>+</sup> (mmol·L <sup>-1</sup> )	Na <sup>+</sup> (mmol·L <sup>-1</sup> )	Ca <sup>2+</sup> (mmol·L <sup>-1</sup> )	Mg <sup>2+</sup> (mmol·L <sup>-1</sup> )
Anthrosol	$d < 2 \mu\text{m}$	0.110	0.149	0.106	0.030
	$d < 1 \mu\text{m}$	0.103	0.185	0.054	0.010
	$d < 100 \text{ nm}$	0.079	0.045	0.060	0.010
Calcisol	$d < 2 \mu\text{m}$	0.091	0.110	0.183	0.027
	$d < 1 \mu\text{m}$	0.084	0.157	0.079	0.006
	$d < 100 \text{ nm}$	0.081	0.107	0.090	0.005



**Fig. S1** The aggregation kinetic curves of Anthrosol colloids in NaCl and CaCl<sub>2</sub> solutions, (a).  $d < 2 \mu\text{m}$  in NaCl, (b).  $d < 2 \mu\text{m}$  in CaCl<sub>2</sub>, (c).  $d < 1 \mu\text{m}$  in NaCl, (d).  $d < 1 \mu\text{m}$  in CaCl<sub>2</sub>, (e).  $d < 100 \text{ nm}$  in NaCl, (f).  $d < 100 \text{ nm}$  in CaCl<sub>2</sub>.



**Fig. S2** The aggregation kinetic curves of Calcolsol colloids in NaCl and CaCl<sub>2</sub> solutions, (a).  $d < 2 \mu\text{m}$  in NaCl, (b).  $d < 2 \mu\text{m}$  in CaCl<sub>2</sub>, (c).  $d < 1 \mu\text{m}$  in NaCl, (d).  $d < 1 \mu\text{m}$  in CaCl<sub>2</sub>, (e).  $d < 100 \text{ nm}$  in NaCl, (f).  $d < 100 \text{ nm}$  in CaCl<sub>2</sub>.