

## Supporting Information

### Microstructure and characterization of the aluminum-incorporated calcium silicate hydrates (C-S-H) under hydrothermal conditions

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Table S1 Solid phase compositions of the hydrothermally treated CaO-SiO<sub>2</sub>-H<sub>2</sub>O system with different aluminum additions determined by Rietveld refinement analyses.

Reaction condition	Al/(Al+Si)	Tobermorite	Quartz	Hydrogarnet	Amorphous phase	$R_{wp}$ (%)	$R_p$ (%)
180 °C, 7 h	0	55.72±2.15	-	-	44.28±2.15	13.92	10.34
	0.01	55.59±2.45	-	-	44.41±2.45	12.23	9.34
	0.03	71.26±3.98	-	-	28.74±3.98	10.82	8.18
	0.06	62.64±2.32	5.27±0.29	1.21±0.25	30.88±2.86	11.70	9.00
	0.09	36.76±1.28	4.47±0.21	1.23±0.20	57.54±1.69	12.40	9.36
	0.12	19.65±1.09	9.76±0.56	2.17±0.40	68.42±2.05	9.13	6.70
180 °C, 5 h	0	37.08±0.15	3.47±1.12	-	59.45±1.27	10.56	8.12
	0.01	39.31±0.14	3.54±1.10	-	57.15±1.24	9.87	7.48
	0.03	64.60±1.75	1.29±0.14	-	34.11±1.89	11.79	9.09
	0.06	43.02±1.26	2.78±0.14	0.51±0.17	53.69±1.57	11.74	8.96
	0.09	23.89±2.98	9.97±1.33	2.74±0.90	63.40±5.21	13.00	9.72
	0.12	12.80±0.16	10.22±0.10	8.01±0.11	68.97±0.37	12.55	9.25
160 °C, 7 h	0	27.19±2.32	2.93±0.13	-	69.88±2.45	11.03	7.71
	0.01	27.31±2.56	2.88±0.11	-	69.81±2.67	10.33	7.77
	0.03	29.69±0.84	5.21±0.21	-	65.10±1.05	11.97	9.13
	0.06	25.30±1.23	10.22±0.55	1.64±0.39	62.84±2.17	11.82	8.88
	0.09	19.20±0.86	12.47±0.54	2.95±0.34	65.38±1.74	13.69	10.66
	0.12	12.54±0.44	12.58±0.19	7.43±0.26	67.45±0.89	10.79	8.35

Indexes:  $R_{wp}$  and  $R_p$  are the final value of the weighted profile  $R$  factors.