Table S1 Comparison of first-order approximation model reaction progress rate constants and Arrhenius parameters for optical calcite reordering experiments for wet-high pressure reactions with and without the initial rapid reordering component of reaction data.

T (°C)	Slope (= k) (s^{-1})	Intercept	R^2	Stats
optical calcite (aqueous, P=100 MPa) – all data				
385	$-1.05 (\pm 0.25) \times 10^{-6}$	$-0.20 (\pm 0.04)$	0.78	b,e,h
405	$-3.23 (\pm 0.32) \times 10^{-6}$	$-0.29 (\pm 0.05)$	0.95	c,d,g
425	$-5.98 (\pm 0.32) \times 10^{-6}$	$-0.39 (\pm 0.03)$	0.99	c,d,g
450	$-2.71 (\pm 0.16) \times 10^{-5}$	$-0.54 (\pm 0.04)$	0.99	b,e,h
Arrhenius regression: $E_a = 196 \pm 24$ kJ/mol			0.97	b,e,i
$k_o = 3.67 \times 10^9\ s^{-1}$ $[(+20.7/-0.36) \times 10^{10}]$				
$k_{ref} = 4.65 (\pm 0.52) \times 10^{-6}\ s^{-1}$				
optical calcite (aqueous, P=100 MPa) – without 60 min. data				
385	$-8.82 (\pm 2.5) \times 10^{-7}$	$-0.24 (\pm 0.04)$	0.76	a,e,i
405	$-3.06 (\pm 0.36) \times 10^{-6}$	$-0.33 (\pm 0.06)$	0.95	c,d,h
425	$-5.82 (\pm 0.35) \times 10^{-6}$	$-0.41 (\pm 0.04)$	0.99	c,d,g
450	$-2.54 (\pm 0.01) \times 10^{-5}$	$-0.63 (\pm 0.002)$	1.00	c,e,g
Arrhenius regression: $E_a = 209 \pm 16$ kJ/mol			0.99	b,e,i
$k_o = 3.08 \times 10^{10}\ s^{-1}$ $[(+38.8/-2.85) \times 10^{10}]$				
$k_{ref} = 4.42 (\pm 0.51) \times 10^{-6}\ s^{-1}$				
optical calcite (aqueous, P=100 MPa) – without 60 or 240 min. data				
385	$-6.49 (\pm 2.6) \times 10^{-7}$	$-0.29 (\pm 0.05)$	0.68	a,f,i
405	$-2.81 (\pm 0.44) \times 10^{-6}$	$-0.38 (\pm 0.08)$	0.93	b,e,i
425	$-5.71 (\pm 0.49) \times 10^{-6}$	$-0.44 (\pm 0.07)$	0.98	c,d,i
450	-2.56×10^{-5}	-0.61	–	
Arrhenius regression: $E_a = 199 \pm 27$ kJ/mol			0.97	b,e,i
$k_o = 5.27 \times 10^9\ s^{-1}$ $[(+55.2/-0.52) \times 10^{10}]$				
$k_{ref} = 3.91 (\pm 0.84) \times 10^{-6}\ s^{-1}$				

Note: Regression analysis followed error weighted least squares regression using statistical software JMP. Error (±) is reported as 1 standard error. All k_{ref} values were evaluated at T_{ref} = 415°C. The error for k_{ref} is reported as the mean relative error of the temperature specific rate constants.

a: Regression ANOVA F-ratio statistic significant at the 0.1 level.

b: Regression ANOVA F-ratio statistic significant at the 0.01 level.

c: Regression ANOVA F-ratio statistic significant at the 0.001 level.

d: Slope significantly different from zero based on the Student *t*-distribution at 0.001 level.
e: Slope significantly different from zero based on the Student *t*-distribution at 0.02 level.
f: Slope significantly different from zero based on the Student *t*-distribution at 0.1 level.
g: Intercept significantly different from zero based on the Student *t*-distribution at 0.001 level.
h: Intercept significantly different from zero based on the Student *t*-distribution at 0.005 level.
i: Intercept significantly different from zero based on the Student *t*-distribution at 0.05 level.