Supplementary Information

Ikaite nucleation at 35°C challenges the use of glendonite as a paleotemperature indicator

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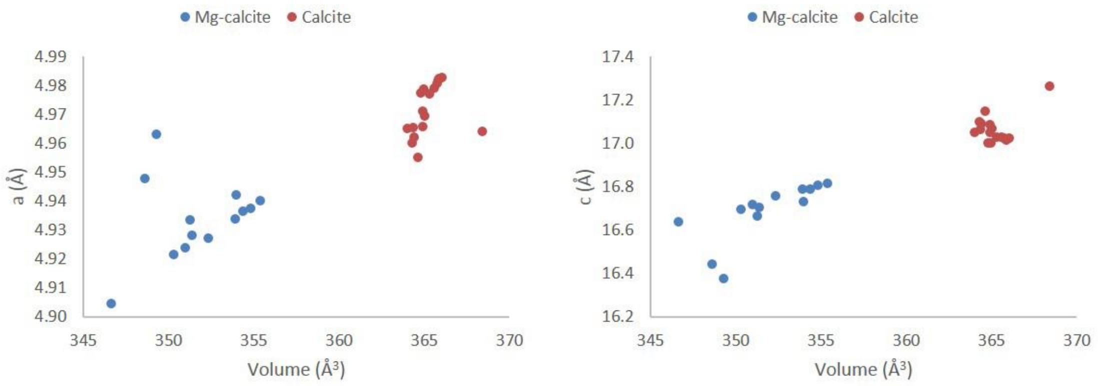
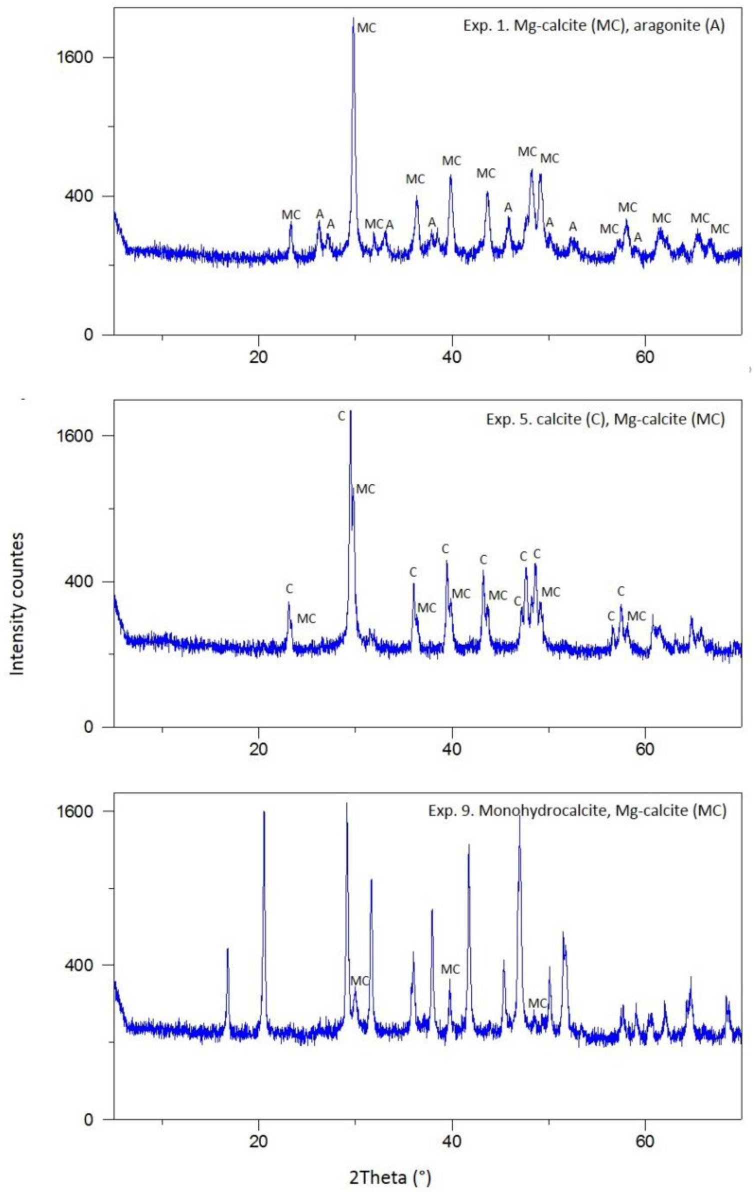


Figure S1. Unit cell data for Mg-calcite and calcite.



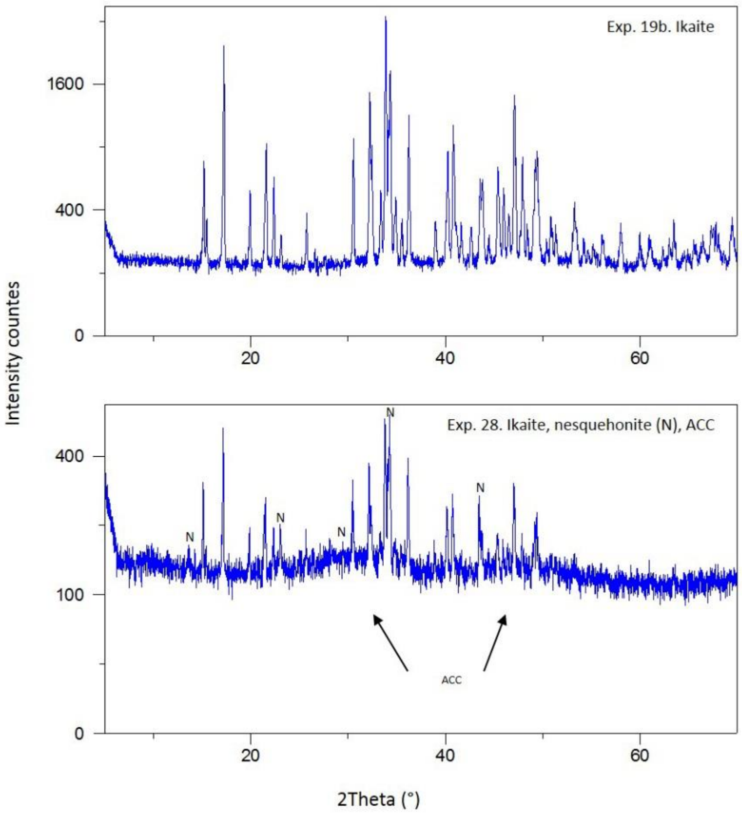
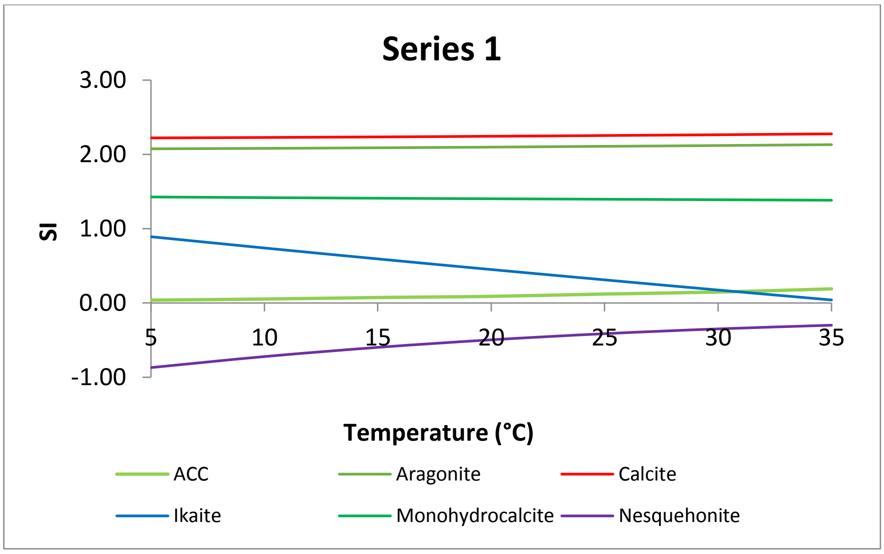
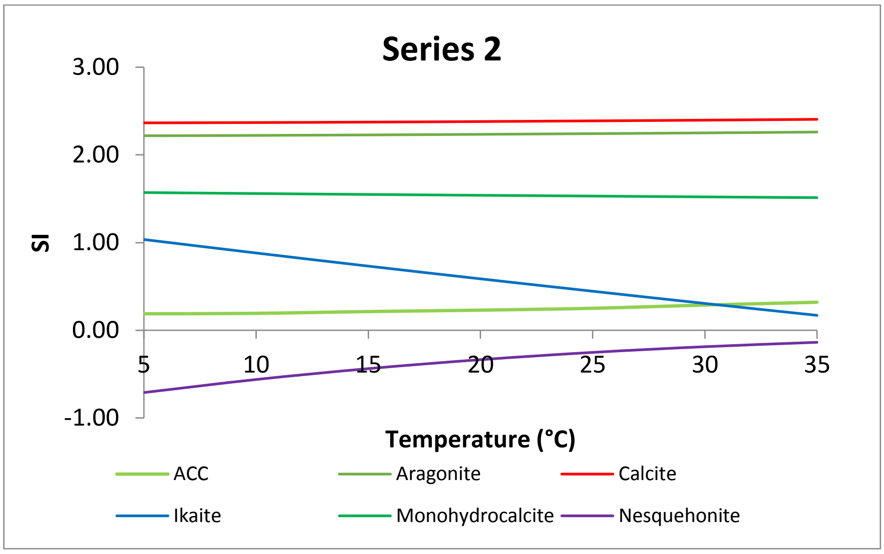
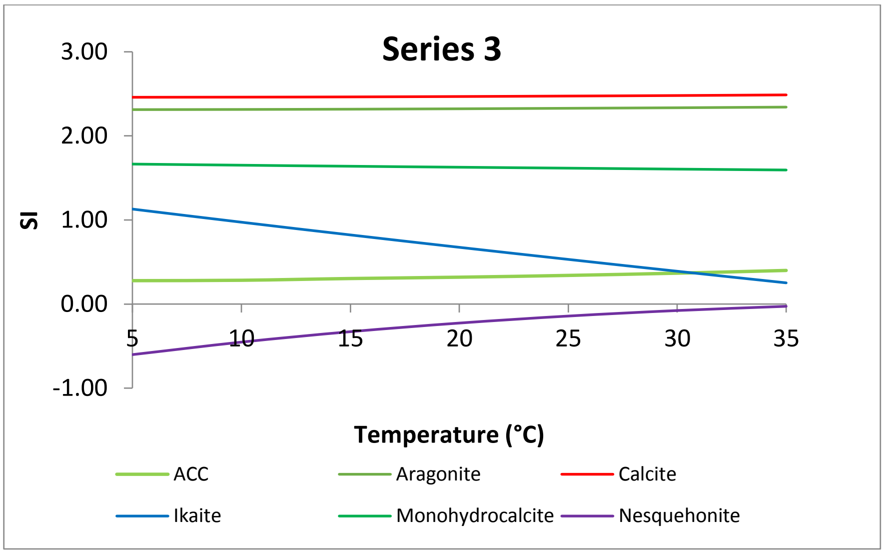
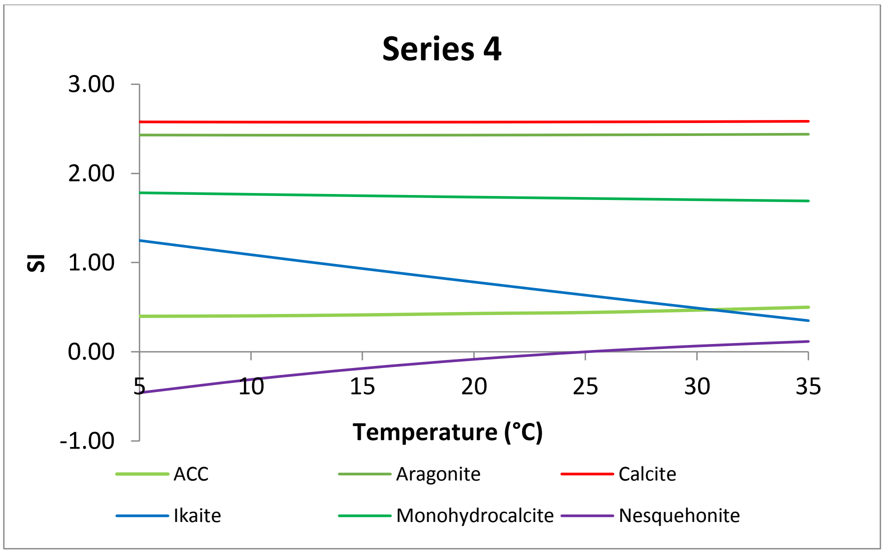


Figure S2. X-ray powder diffraction spectra for exp. 1, 5, 9, 19b and 28. Exp. 1 shows peaks for Mg-calcite (MC) and aragonite (A). Exp. 5 shows peaks for calcite (C) and Mg-calcite (MC). Exp. 9 shows peaks for monohydrocalcite (unlabelled) and Mg-calcite (MC). Exp. 19b shows peaks for only ikaite. Exp. 28 shows peaks for ikaite (unlabelled), nesquehonite (N) and amorphous calcium carbonate (ACC) indicated by the arrows.




Series 2
3.00
2.00
1.00
0.00
-1.00
SI
5
10
15
20
25
30
35
Temperature (°C)
ACC
Aragonite
Calcite
Ikaite
Monohydrocalcite
Nesquehonite


Series 3
3.00
2.00
1.00
0.00
-1.00
SI
5
10
15
20
25
30
35
Temperature (°C)
ACC
Aragonite
Calcite
Ikaite
Monohydrocalcite
Nesquehonite


Series 4
3.00
2.00
1.00
0.00
-1.00
SI
5
10
15
20
25
30
35
Temperature (°C)
ACC
Aragonite
Calcite
Ikaite
Monohydrocalcite
Nesquehonite

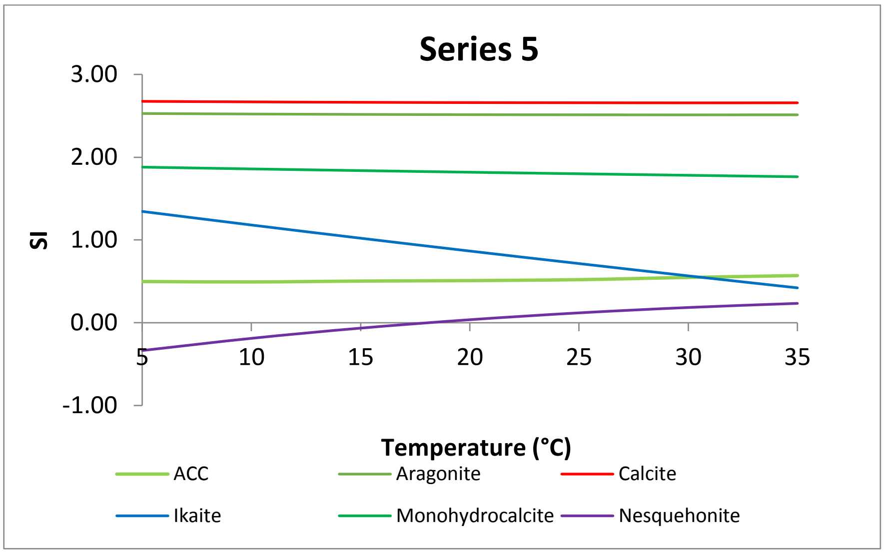
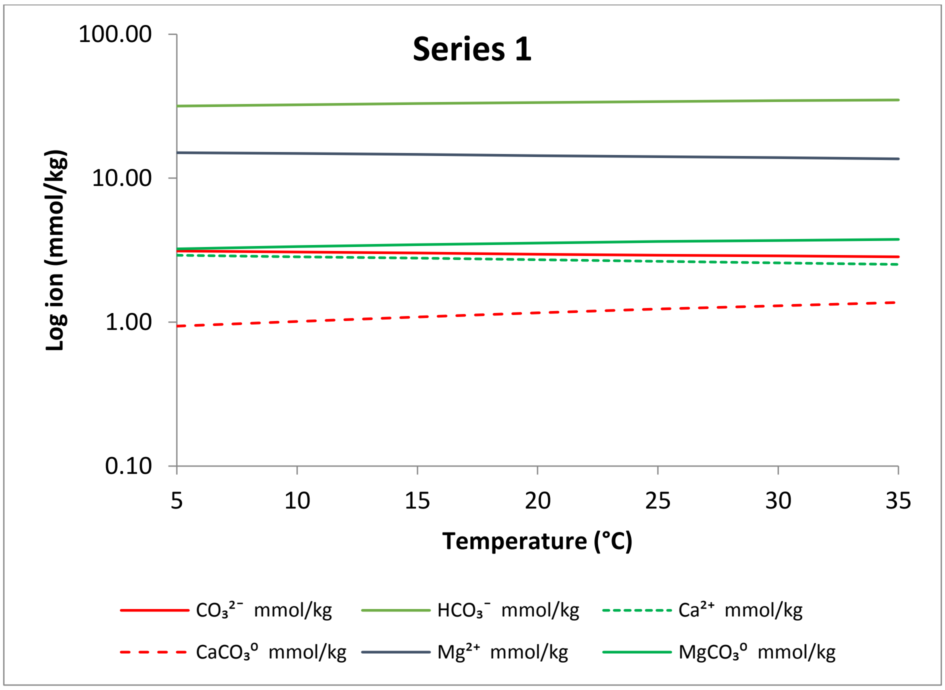
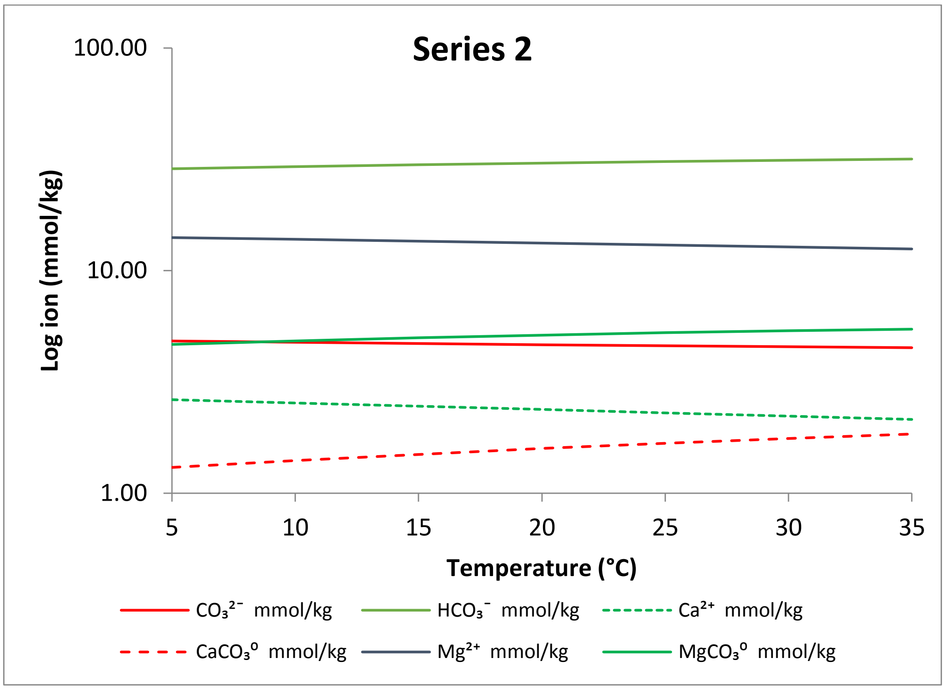
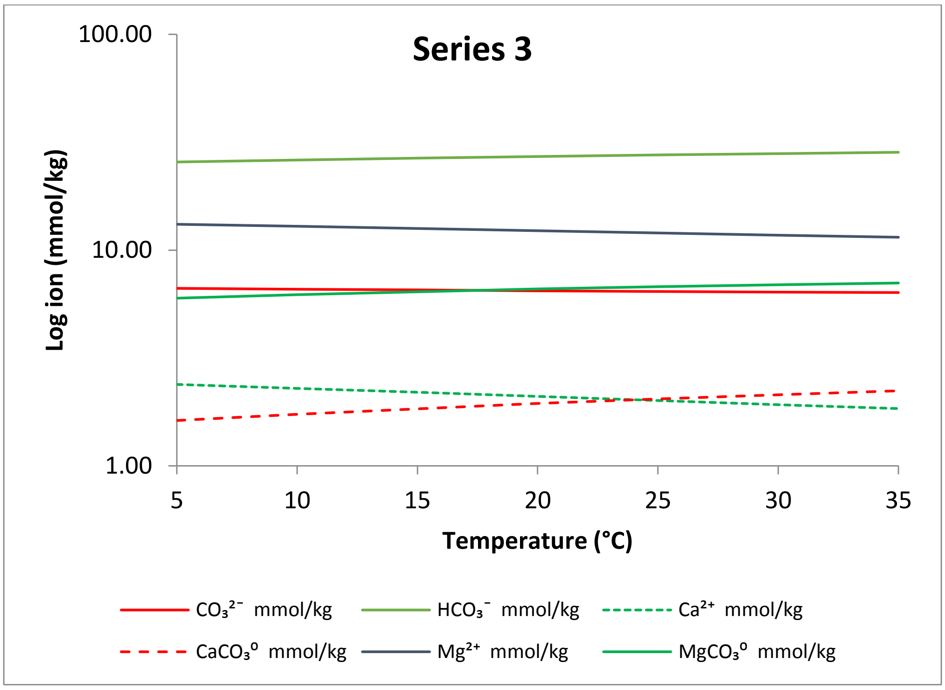
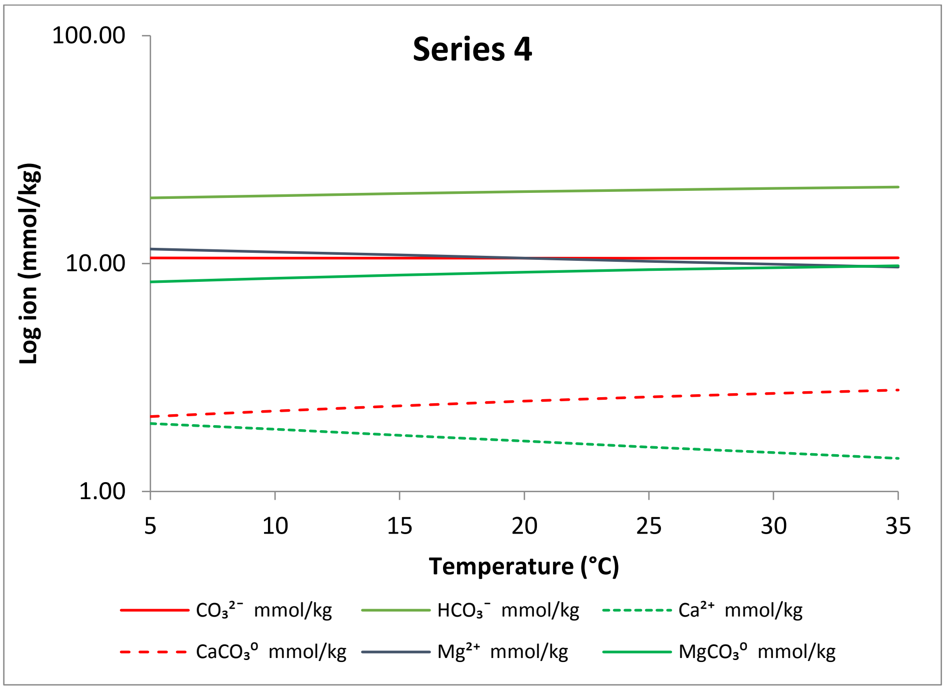


Figure S3. Saturation indices (SI) calculated with PhreeqC.




Series 2
100.00
10.00
1.00
Log ion (mmol/kg)
5
10
15
20
25
30
35
Temperature (°C)
CO_3^{2-} mmol/kg
HCO_3^- mmol/kg
Ca^{2+} mmol/kg
$CaCO_3^o$ mmol/kg
Mg^{2+} mmol/kg
$MgCO_3^o$ mmol/kg


Series 3
100.00
10.00
1.00
Log ion (mmol/kg)
5
10
15
20
25
30
35
Temperature (°C)
CO_3^{2-} mmol/kg
HCO_3^- mmol/kg
Ca^{2+} mmol/kg
$CaCO_3^o$ mmol/kg
Mg^{2+} mmol/kg
$MgCO_3^o$ mmol/kg



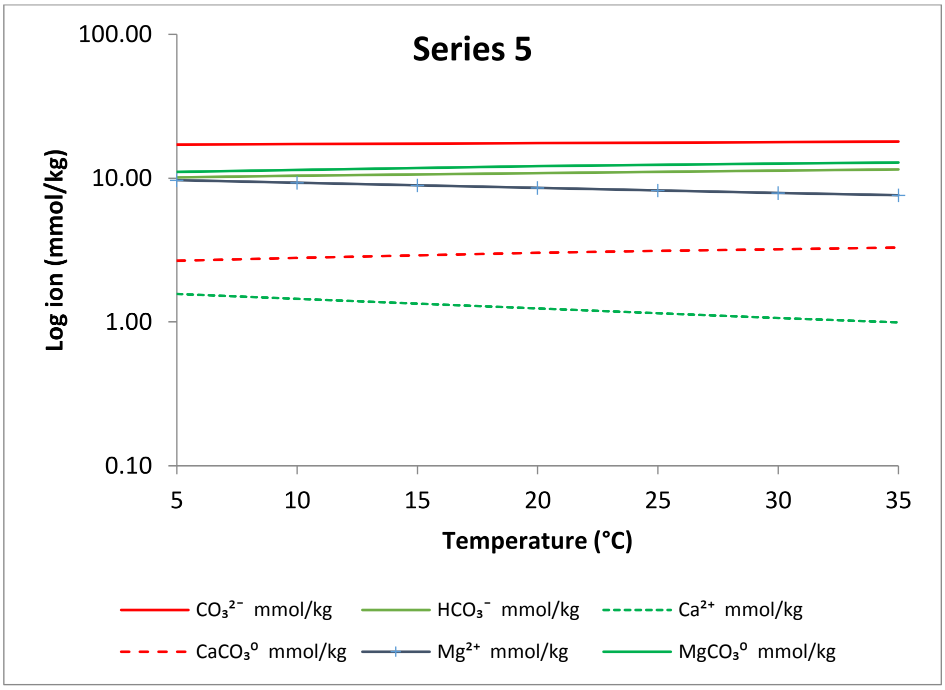


Figure S4. Ion concentrations calculated with PhreeqC.

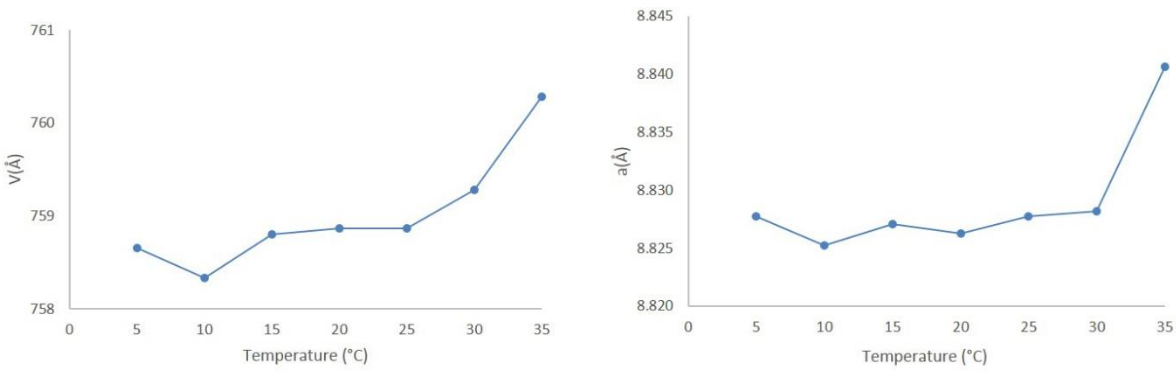
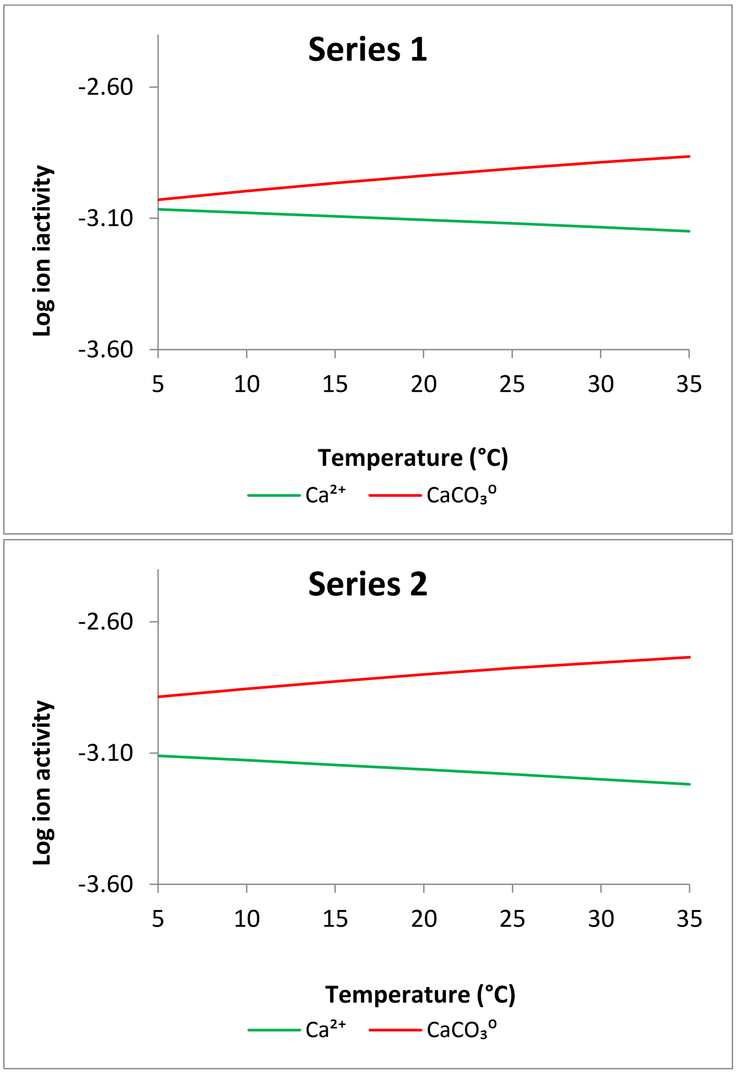


Figure S5. Variation in lattice parameters (Volume and a-axis) for ikaite with temperature in Series 4.



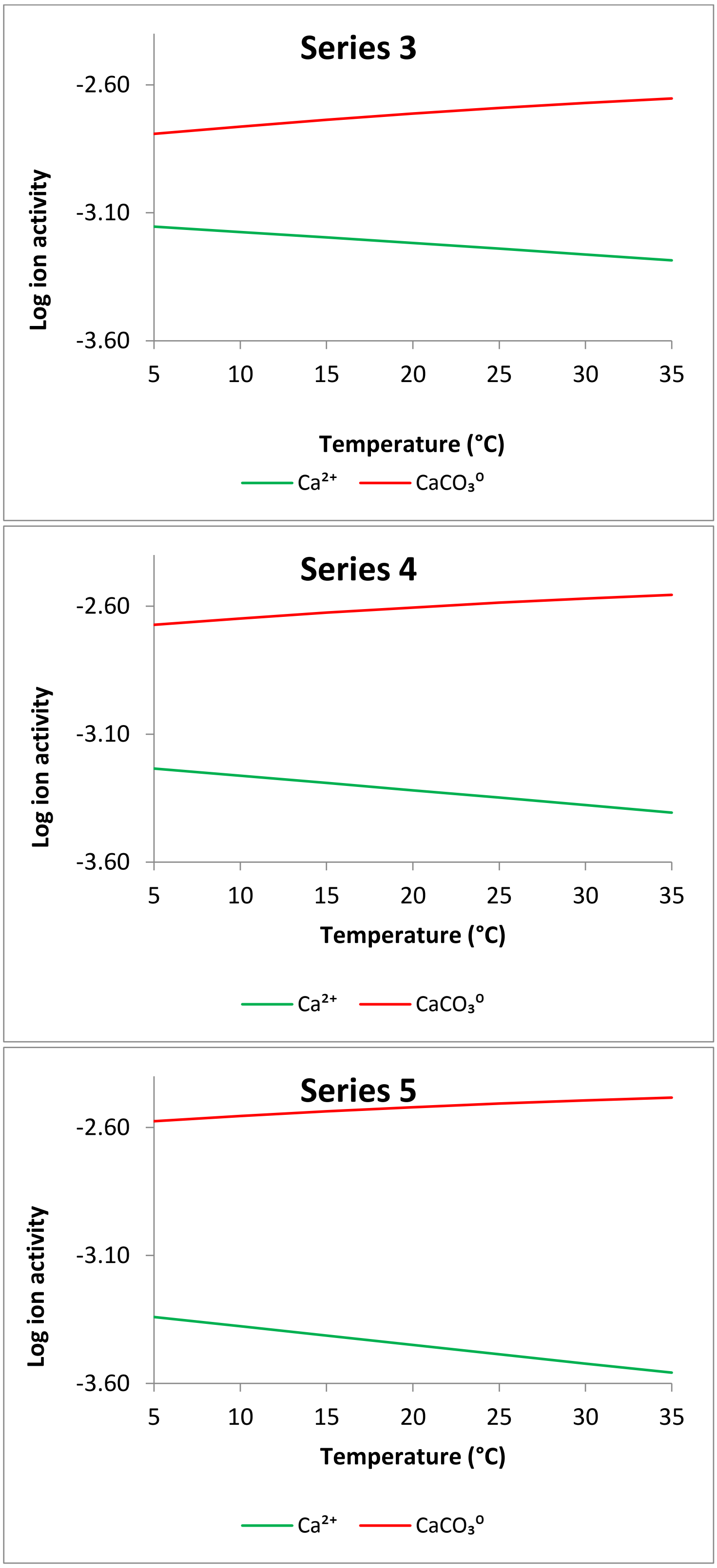


Figure S6. Log ion activity calculated with PhreeqC.