Electronic Supplementary Material (ESI) for CrystEngComm.

Supporting information

In-situ atomic force microscopic (AFM) investigation of kaolinite dissolution in high caustic environments

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Figure S1. Schematic of the kaolinite structure as viewed from the *a* axis

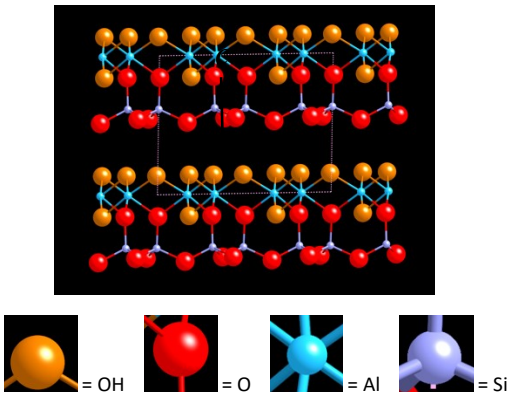


Figure S2 0.5 nm (5 Å) height in *c* direction could be due to either octahedral or tetrahedral sheet with water layer, both sheets are ~0.2 nm

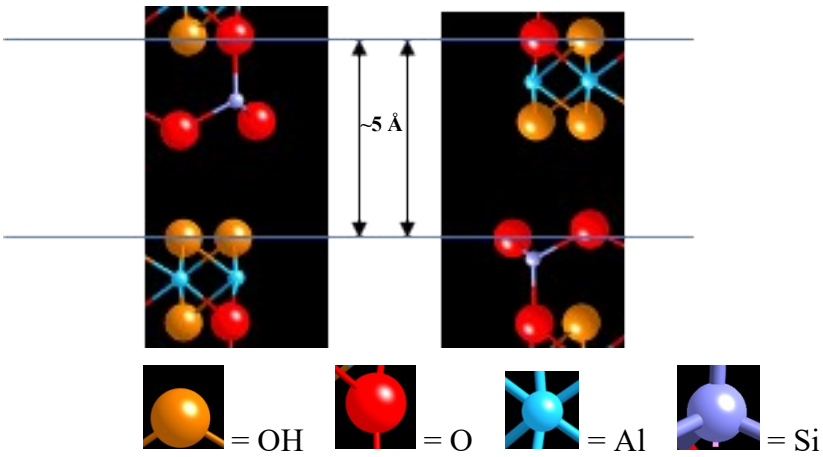


Figure S3 Schematic showing the liquid cell set up for the AFM measurements

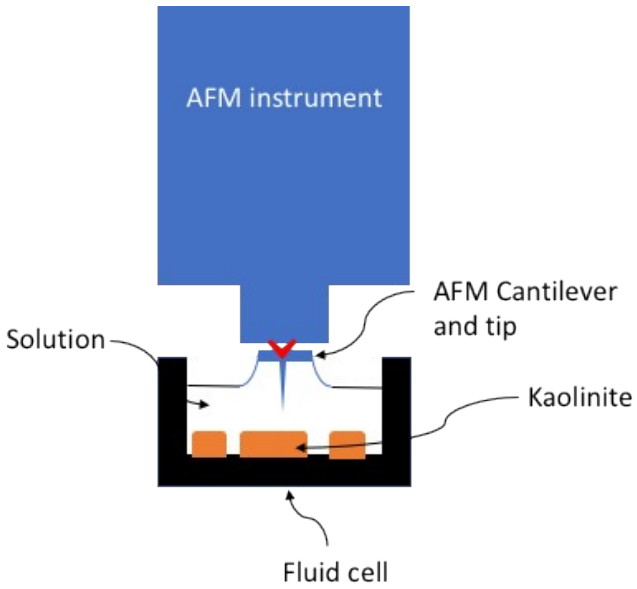
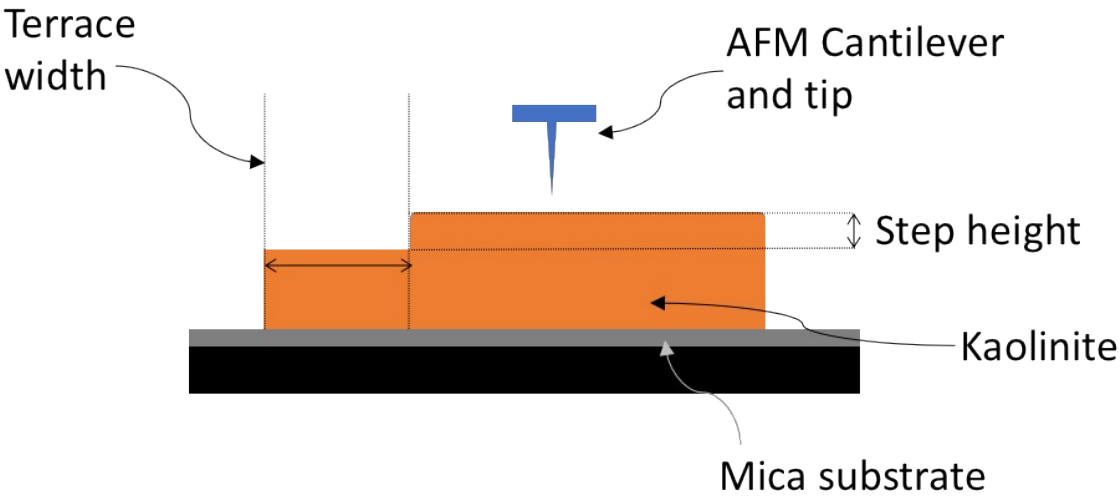
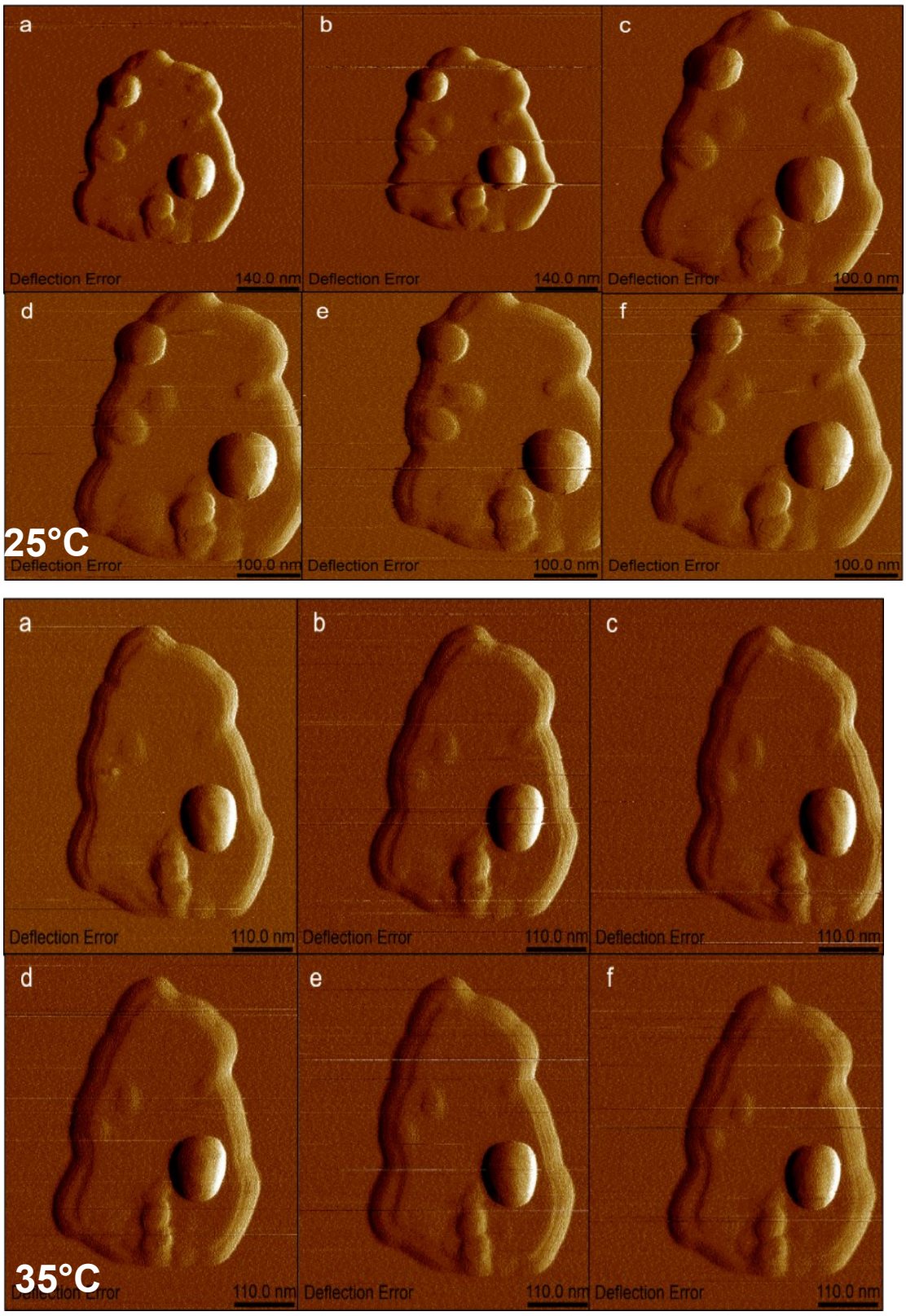


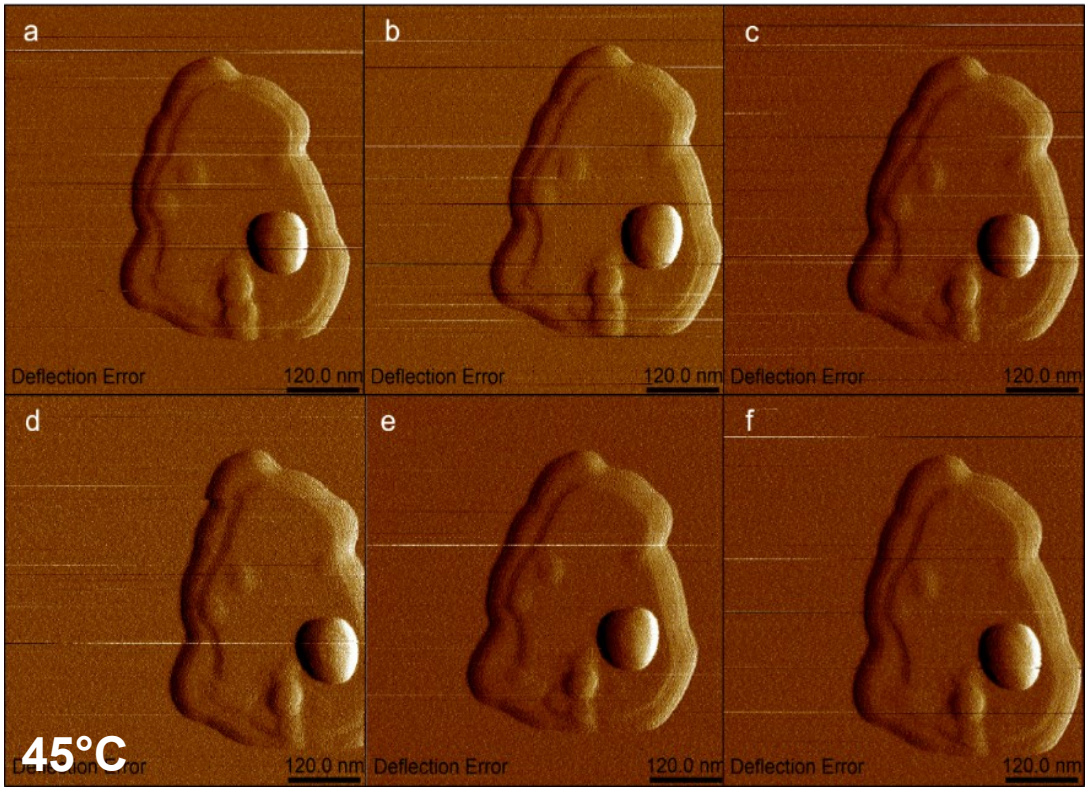
Figure S4 Schematic of a kaolinite particle showing the measurement of step height and terrace width



Pure Caustic

Figure S5. AFM *deflection* images at different temperatures.




a
b
c
d
e
f
Deflection Error
120.0 nm
45°C

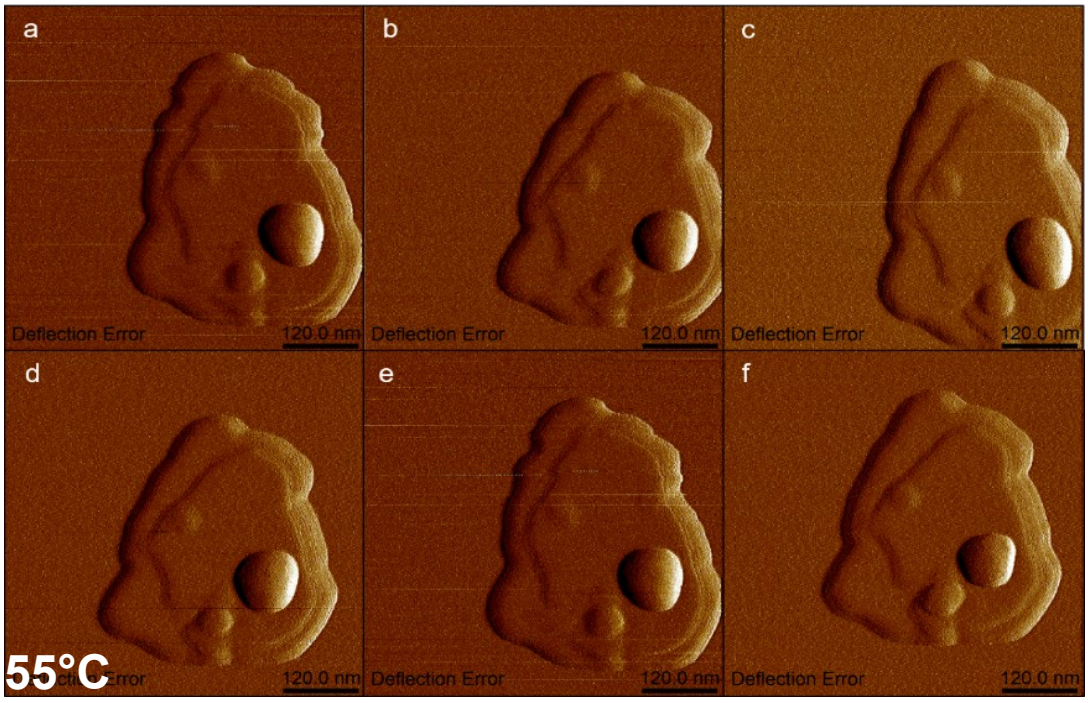

a
b
c
d
e
f
Deflection Error
120.0 nm
55°C

Figure S5b

Step height measured on original scan (25°C) and after 36 scans (temperature 55°C)

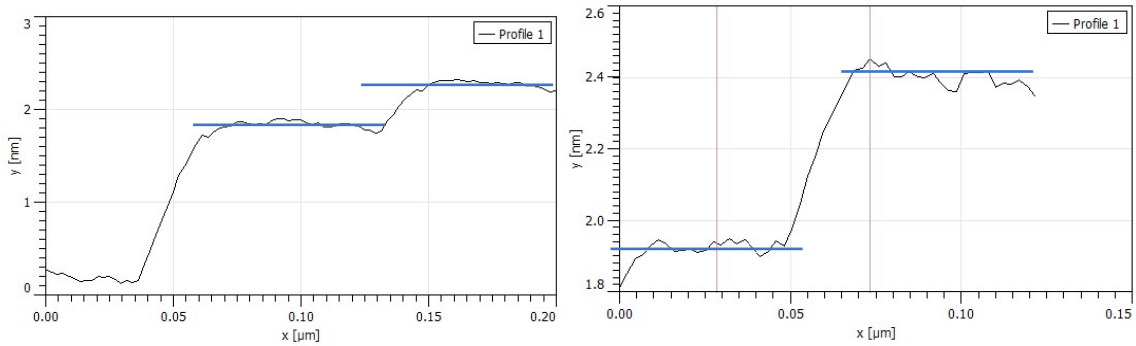
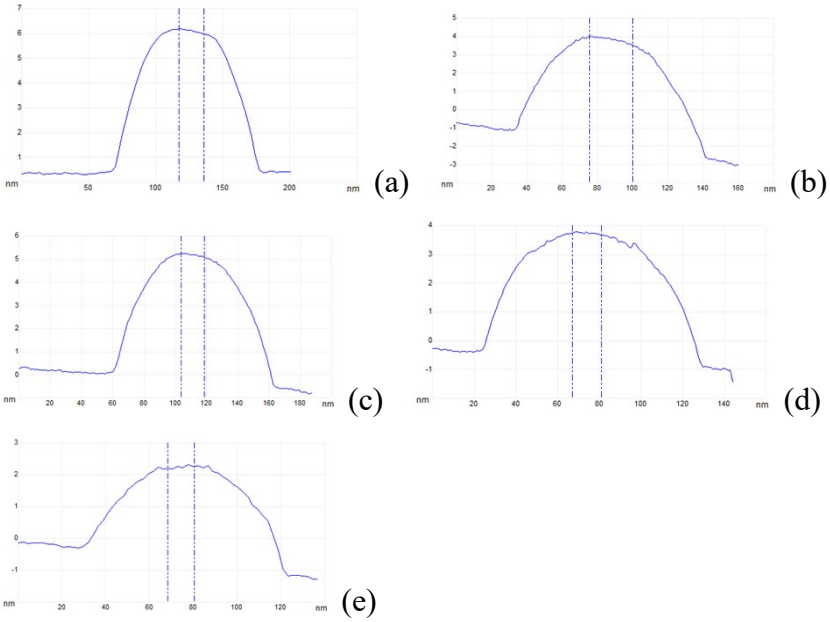


Figure S6. Spot 1 over time (time increases going from a-e)



Width change over this time = 100.0 to 92.0 nm = 8.0 nm

Height change over this time = 5.8 to 2.5 nm = 3.3 nm

Figure S7. Comparison of step terrace width versus time in pure caustic and in synthetic Bayer liquor at 25°C and 45°C

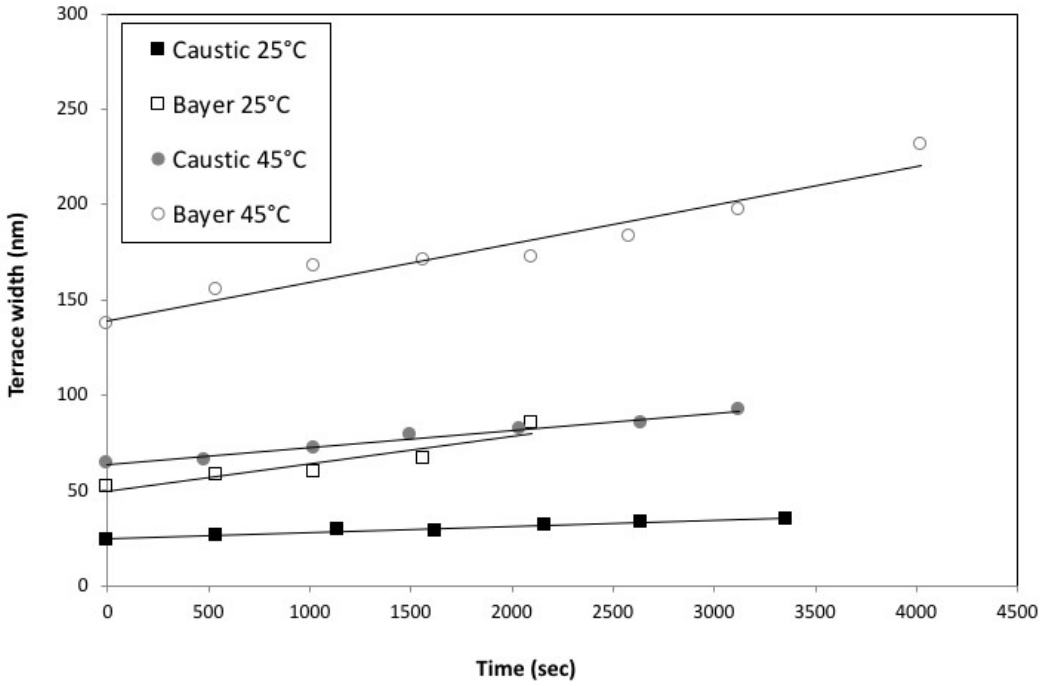
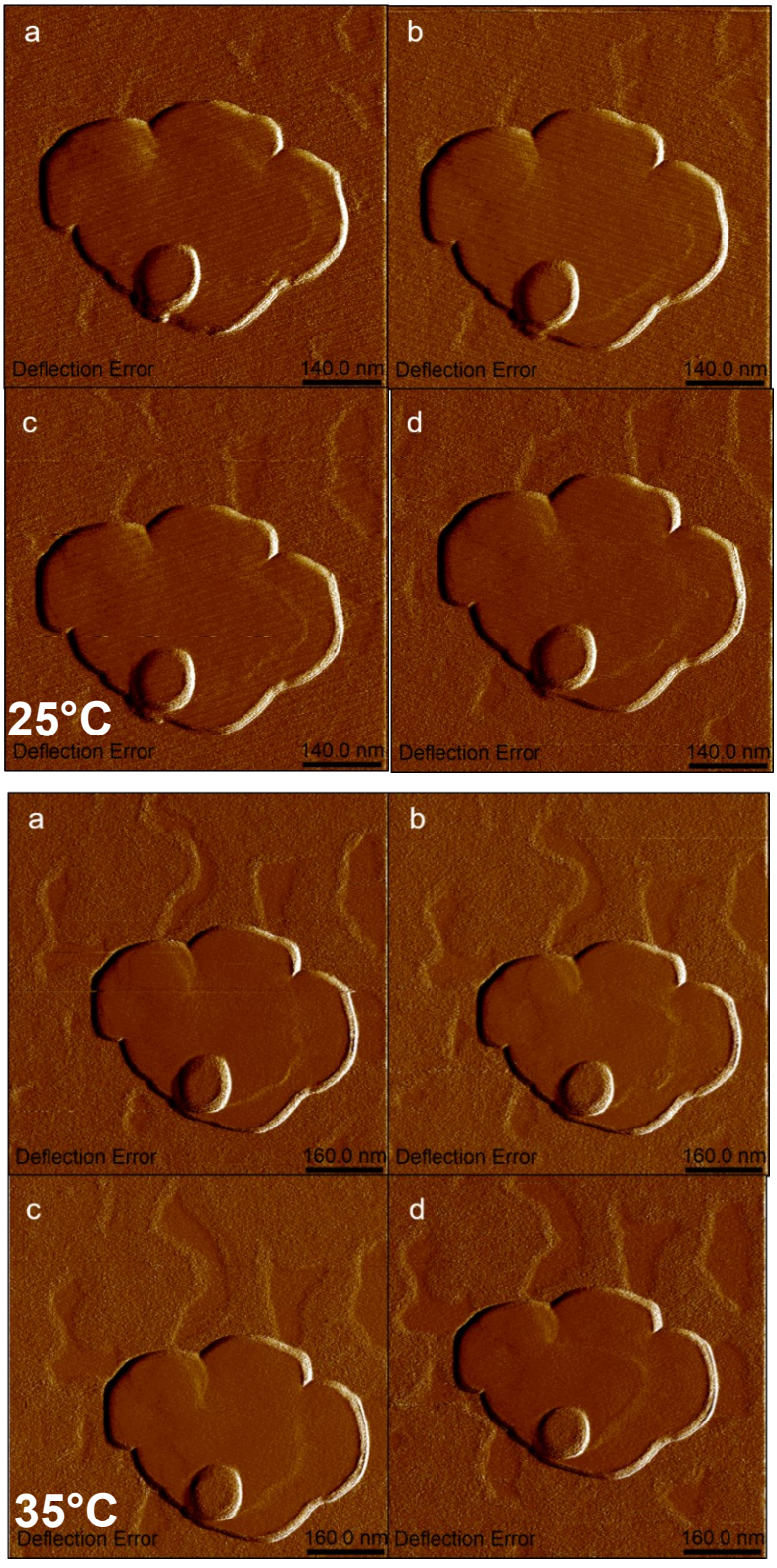
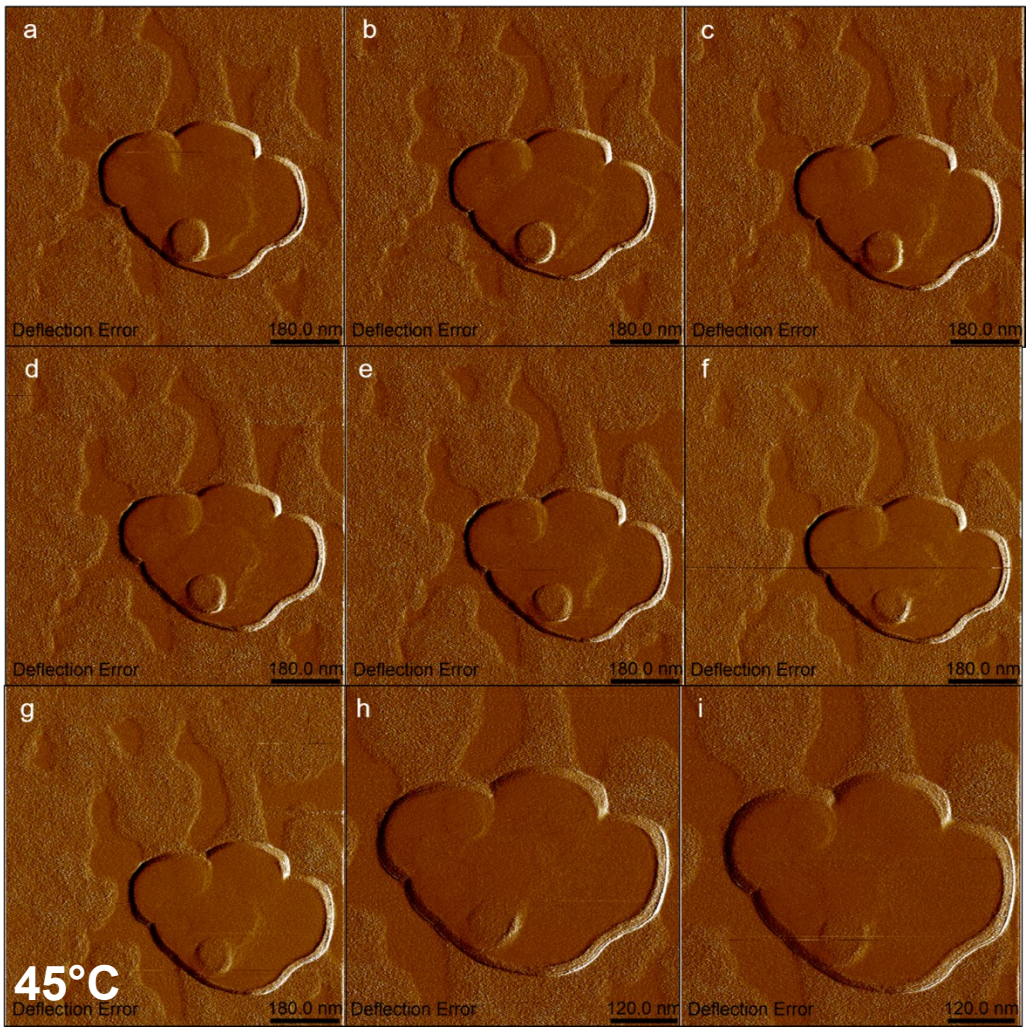


Figure S8. AFM deflection images of kaolinite in synthetic Bayer liquor at different temperatures




a
Deflection Error
180.0 nm
b
Deflection Error
180.0 nm
c
Deflection Error
180.0 nm
d
Deflection Error
180.0 nm
e
Deflection Error
180.0 nm
f
Deflection Error
180.0 nm
g
45°C
Deflection Error
180.0 nm
h
Deflection Error
120.0 nm
i
Deflection Error
120.0 nm

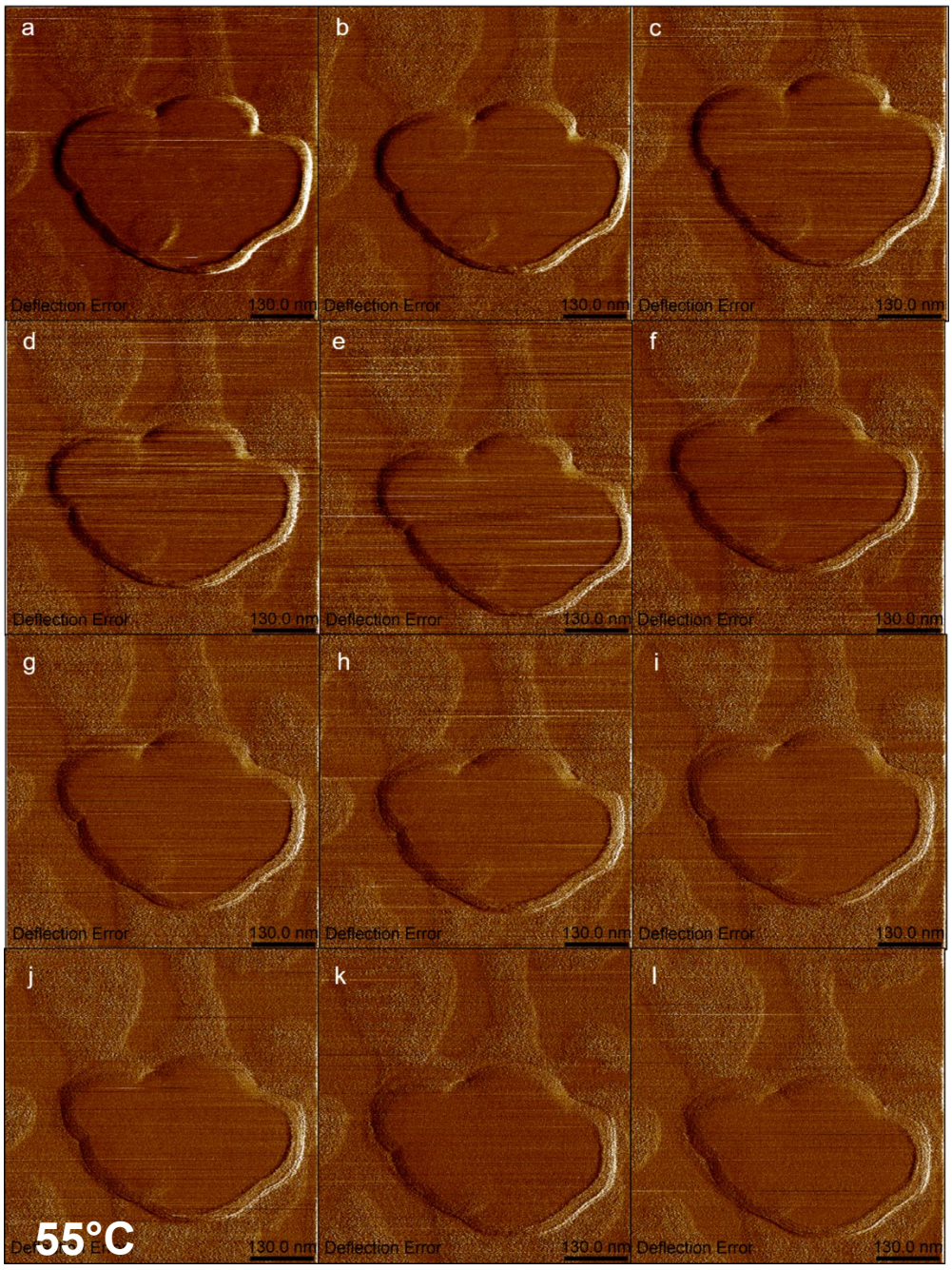

a
b
c
d
e
f
g
h
i
j
k
l
Deflection Error
130.0 nm
55°C

Figure S9. AFM deflection images collected over time of kaolinite in synthetic Bayer liquor with waterglass added at 55°C