

Supporting Information

Structure of silica polymers and reaction mechanism for formation of silica-rich precipitated phases in direct aqueous carbon mineralisation

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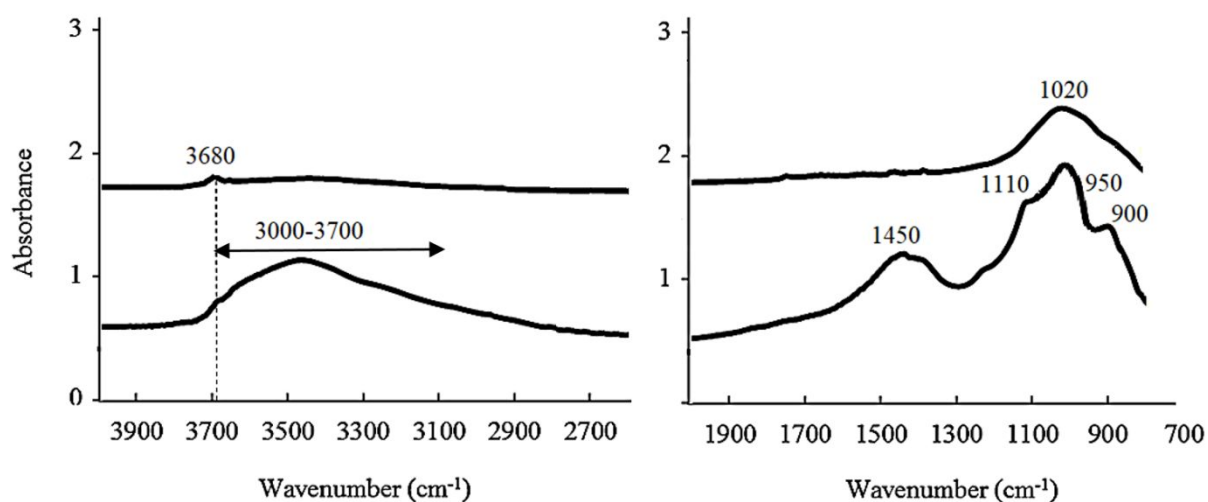


Figure S1: FT-IR spectra of HAL7 (top) and the carbonation product (bottom). Peaks, cm^{-1} , are assigned as follows: at 3680 (stretching vibration of hydroxyl groups bonded to magnesium octahedral), the broad band from 3000 to 3700 (formation of hydrogen-bonded vicinal silanol nests, that consist of a number of silanol groups interacting through extended hydrogen bonding), at 1450 (carbonate phase), at 1110 (Si-O bond, out of plane vibrations) at 1020 (talc-like structure), at 950 (Si-O bond, in plane vibrations) and at 900 (Si-OH, bending vibration of free silanol groups on the surface of the amorphous solid) (modified from Ref. (13)).

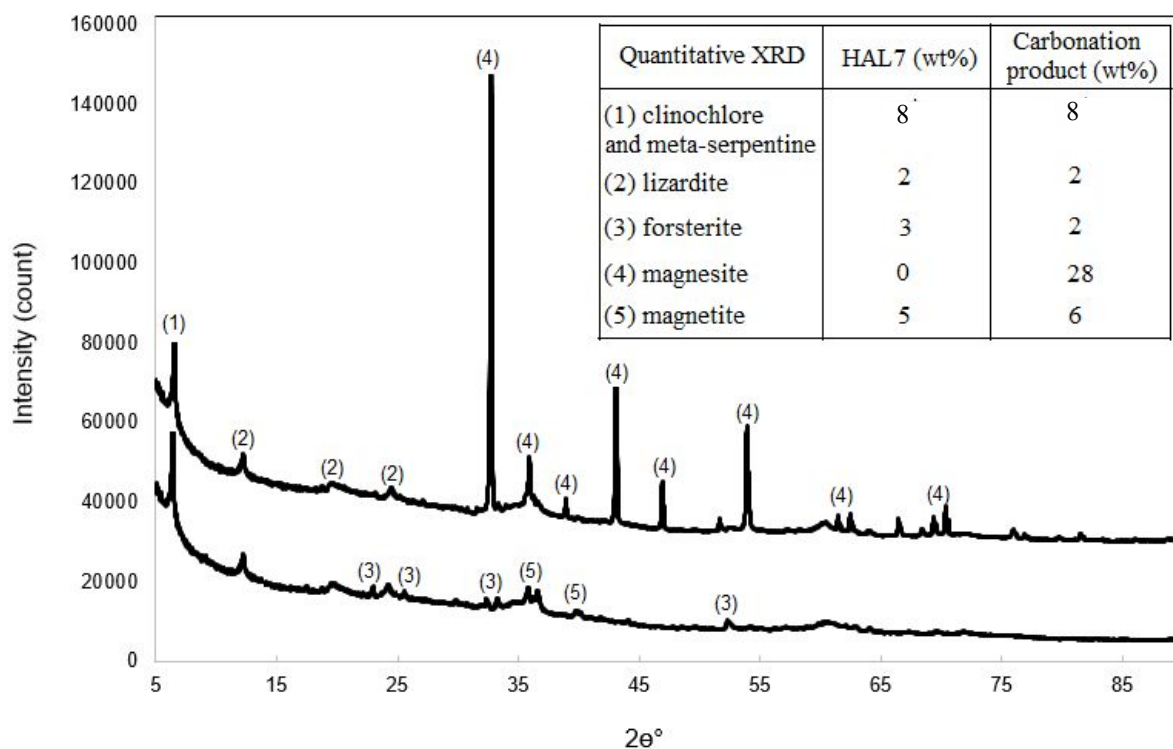


Figure S2: XRPD patterns and concentrations of each crystalline phase (measured by quantitative XRPD) in HAL7 (bottom) and the carbonation product (top).

* Concentration of clinocllore only

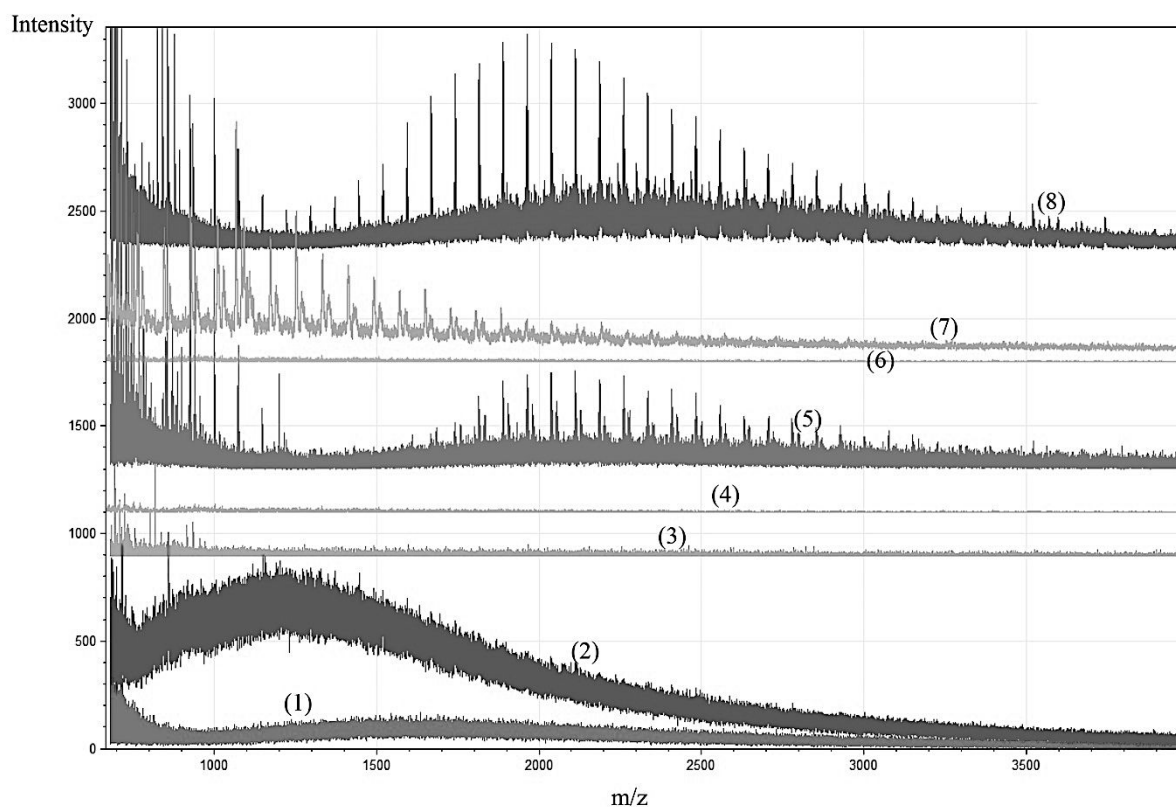


Figure S3: MS spectra of polydimethylsiloxane standard analysed by MALDI-TOF. (1) DCTB matrix and THF dilution, weak signal detection, (2) DCTB matrix and acetone dilution, weak signal detection, (3) SA matrix and THF dilution, no signal detection, (4) SA matrix and acetone dilution, no signal detection, (5) DHB matrix and acetone dilution, average MW = 2150 m/z and repeating mass unit = 75 amu, (6) DHB matrix and THF dilution, no signal detection, (7) CHCA matrix and acetone dilution, average MW = 950 m/z and repeating mass unit = 75 amu, (8) CHCA matrix and THF dilution, average MW = 1980 m/z and repeating mass unit = 75 amu.

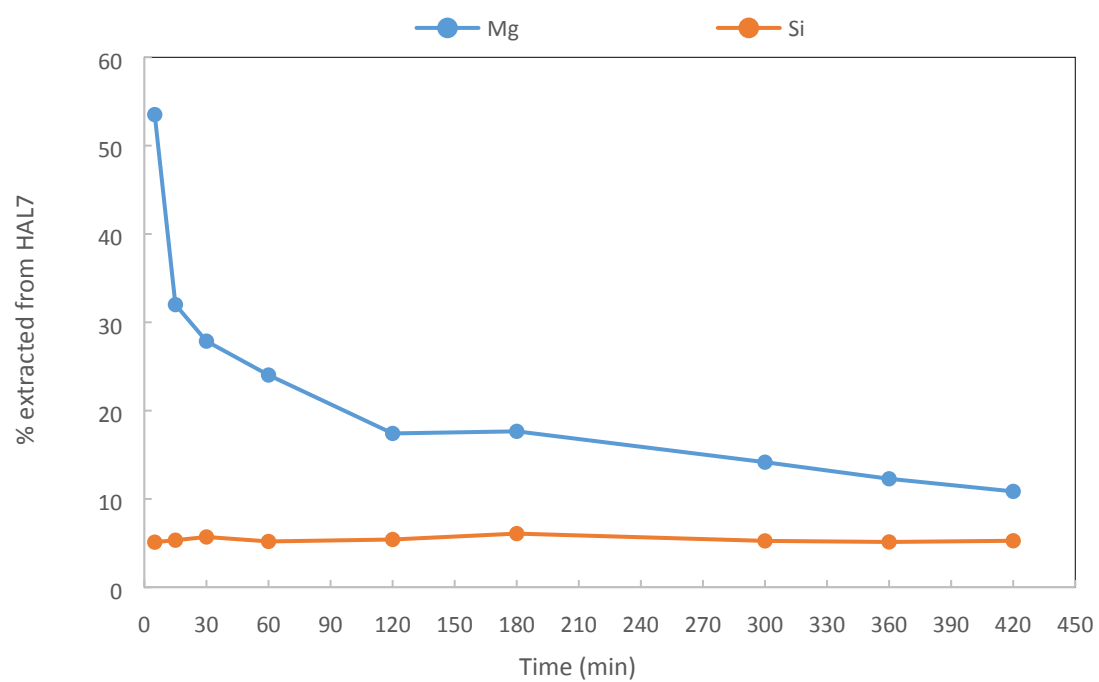
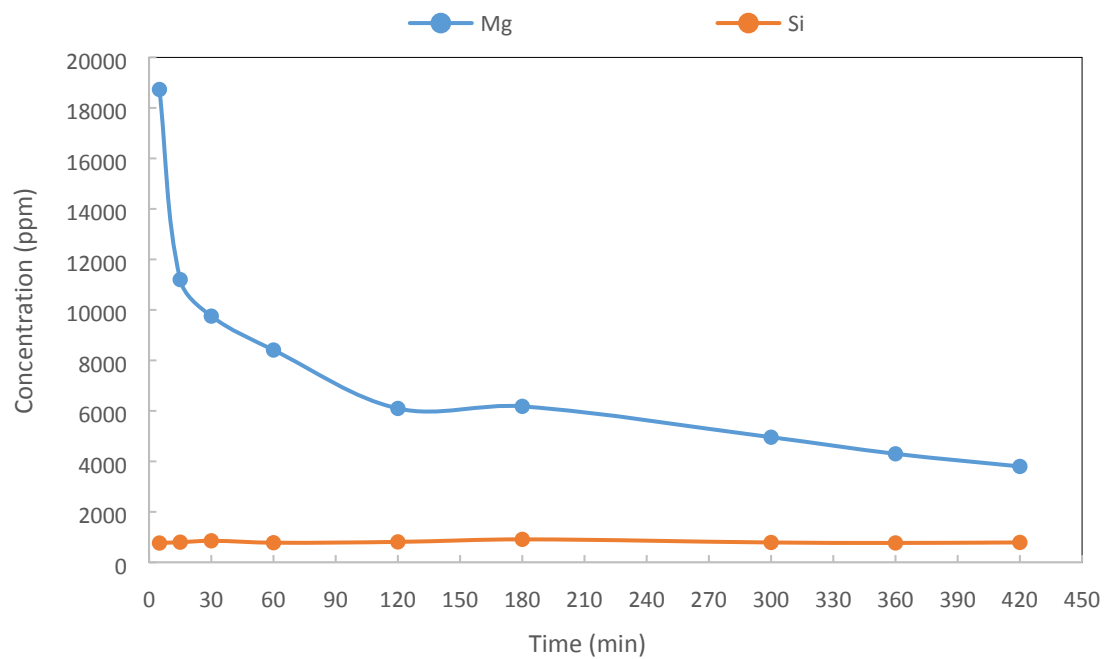


Figure S4: Concentration and the extent of extraction of Mg and Si from HAL7 during single stage aqueous carbonation