

## SUPPLEMENTARY INFORMATION

A typical Rietveld refinement of single-phase mayenite is shown in Figure 1. Experimental parameters and final residual values are listed in Table 1. The inset of Figure 1 shows the angular region, in which the most intense peaks of CA and C3A are found to illustrate the phase purity. For comparison, the XRD of a sample containing traces of both impurities is also shown. The small step visible at 32.2 °2 $\theta$  results from the absorption edge of the applied Ni-filter.

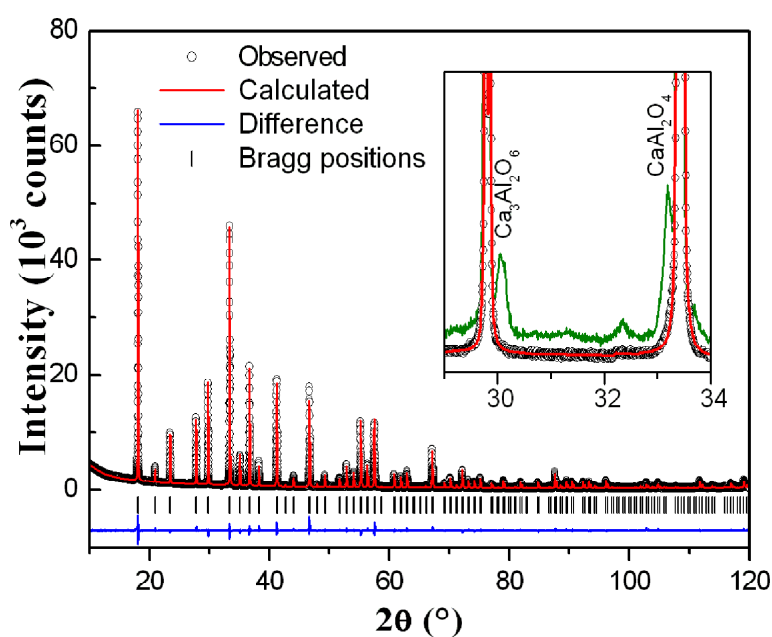


Figure 1: Rietveld refinement plot of  $\text{Ca}_{12}\text{Al}_{14}\text{O}_{33}$ . The inset shows the region in which the main peaks of CA and C3A occur. For comparison the XRD of a sample containing small amounts of CA and C3A is additionally shown.

Table 1: Experimental parameters and residual parameters for the Rietveld refinement shown in Figure 1.

Diffractometer	Bruker D8 Advance (Bragg-Brentano theta-theta geometry)
Radiation	Cu-K $_{\alpha 1,2}$ (1.5406 Å+1.5444 Å)
Detector	LynX Eye (linear silicon strip detector)
Angular range	$10 \leq 2\theta \leq 120$ °2 $\theta$
Step width	0.005244 °2 $\theta$
Counting time/data point	2.5 seconds
R <sub>p</sub>	3.94
R <sub>wp</sub>	5.48
R <sub>Bragg</sub>	3.36
$\chi^2$	2.99