



Measuring CO₂ Mineralization in Concrete

CarbonCure uses a proprietary technology that injects captured carbon dioxide (CO₂) into concrete during the manufacturing process, where it is permanently mineralized. This facilitates the production of low carbon concrete and helps address the widespread problem of [embodied carbon](#) in construction.

We use a rigorous methodology for [measurement, monitoring, and verification \(MMV\)](#) of our carbon removal and reduction which is independently verified. As part of this methodology, we measure the uptake of CO₂ in the carbon mineralization process.

Experiment

- A load of concrete is batched at a local plant and delivered to our lab where a sample is removed as the baseline condition.
- We then inject CO₂ at a dose of 0.1% by weight of cement, and mix for five minutes.
- We repeat the experiment for incremental CO₂ dosage increases to 0.2, 0.3, and 0.4%.

Carbon Analysis

Concrete samples are tested using an Eltra CS800 carbon-sulfur analyzer, and the average carbon value is used as the result. For accuracy, tests are repeated if two samples differed by more than 0.03%.

Note that CO₂ is present in other components of a concrete mix (aggregates, cement, admixtures, etc.) so measurements must be adjusted to account for those other factors.

X-Ray Diffraction Analysis

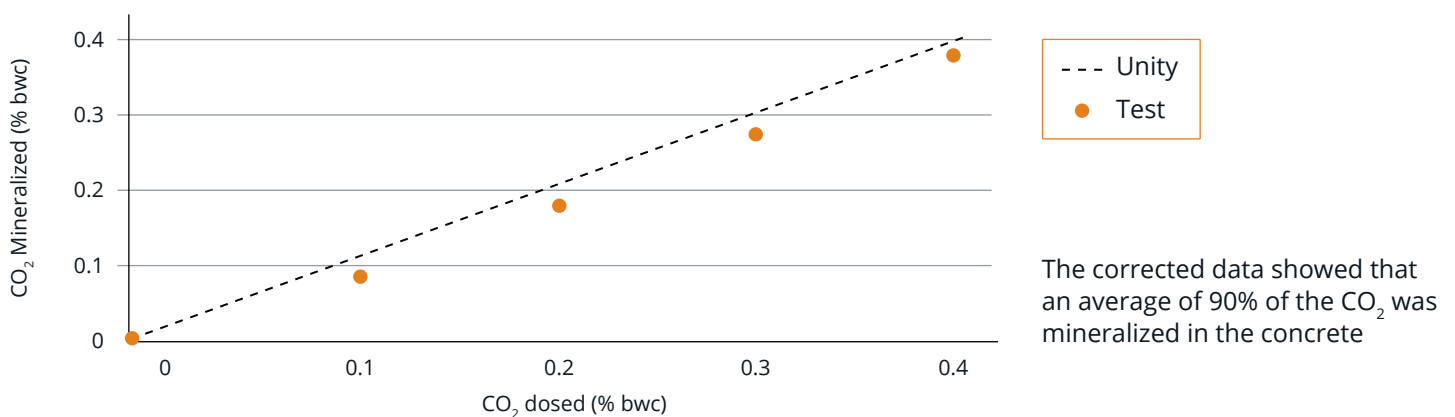
To identify that mineralization has taken place, concrete samples are pulverized using a McCrone micronizing mill, X-ray diffraction (XRD) scans are completed using a Rigaku MiniFlex with a scan range of 0 – 70 (°2θ), and Rietveld refinement was completed using Smartlab Studios II software.

Efficient CO₂ Uptake is Observed, Especially in Higher CO₂ Dosages

ID	Injected CO ₂ (%)	Measured CO ₂ (%)	Measured Aggregate (%)	Corrected CO ₂ (%)	Efficiency (%)
Control	0	0	10.7	0	-
CO ₂ 0.1%	0.1	0.077	9.8	0.085	85
CO ₂ 0.2%	0.2	0.157	13.0	0.180	90
CO ₂ 0.3%	0.3	0.235	12.0	0.267	89
CO ₂ 0.4%	0.4	0.325	13.3	0.375	94

CarbonCure's Mineralization Process Results in an Average 90% CO₂ Uptake

The results of our experiment demonstrate a strong linear relationship between injected and mineralized CO₂. The sensors are not able to quantify the exact amount of CO₂ lost in the injection process, but it is certainly a very small percentage, particularly at higher dosages.



If you have any questions about our carbon mineralization, or MMV processes or analyses, please do not hesitate to contact us anytime at sales@carboncure.com.