

Assessing the carbon sequestration potential of magnesium oxychloride cement boards

This study 1) documented the fate of fixed CO₂ within magnesium oxychloride (MOC) boards, 2) fingerprinted the source of CO₂ to confirm its value as a greenhouse gas offset, 3) determined the passive rate of CO₂ sequestration within boards under ambient factory conditions, and 4) determined the potential for accelerating carbonation of MOC board using elevated concentrations of CO₂.



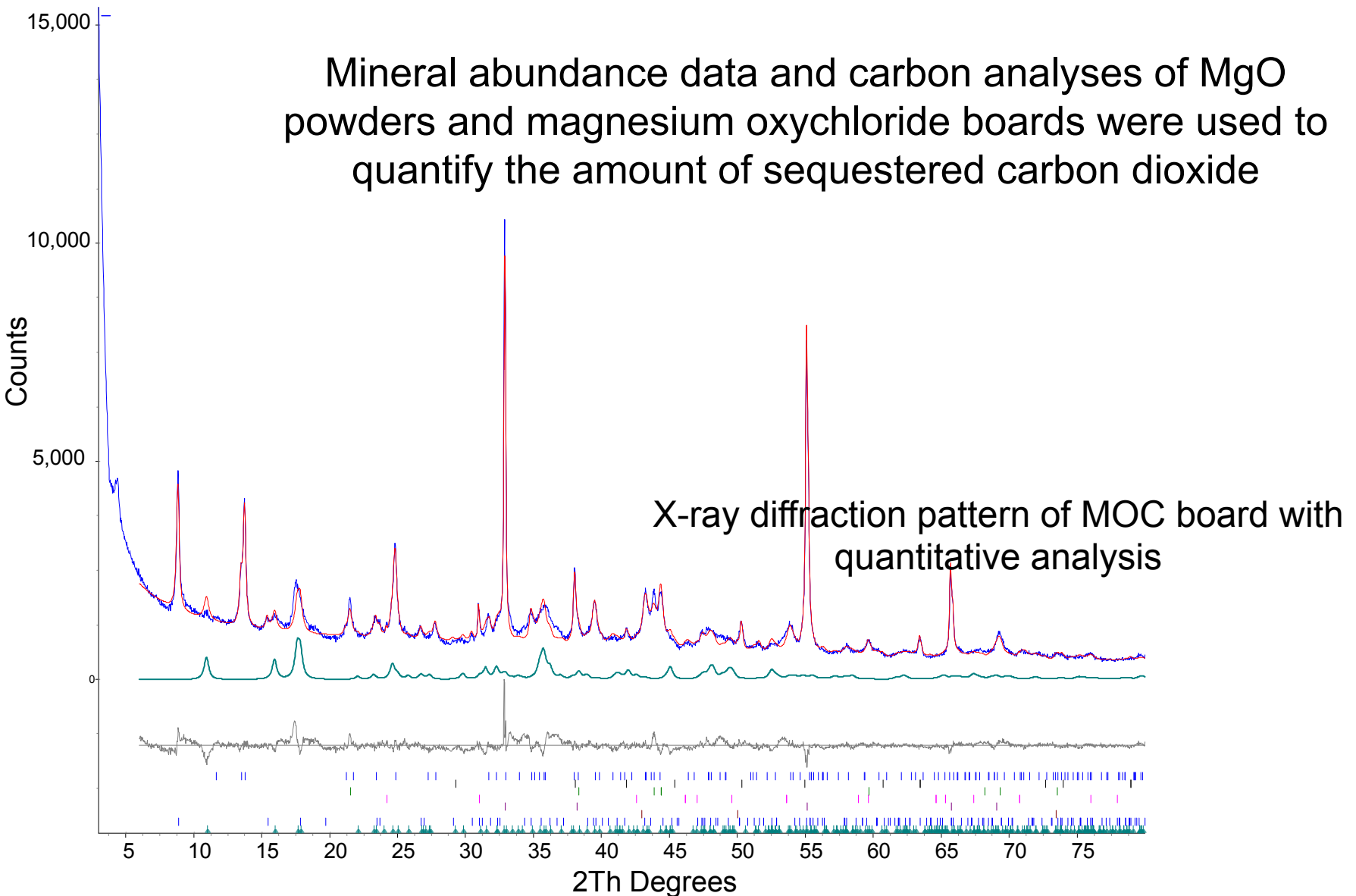
Ian Power* and Greg Dipple

Department of Earth, Ocean and Atmospheric Sciences
The University of British Columbia, *ipower@eos.ubc.ca

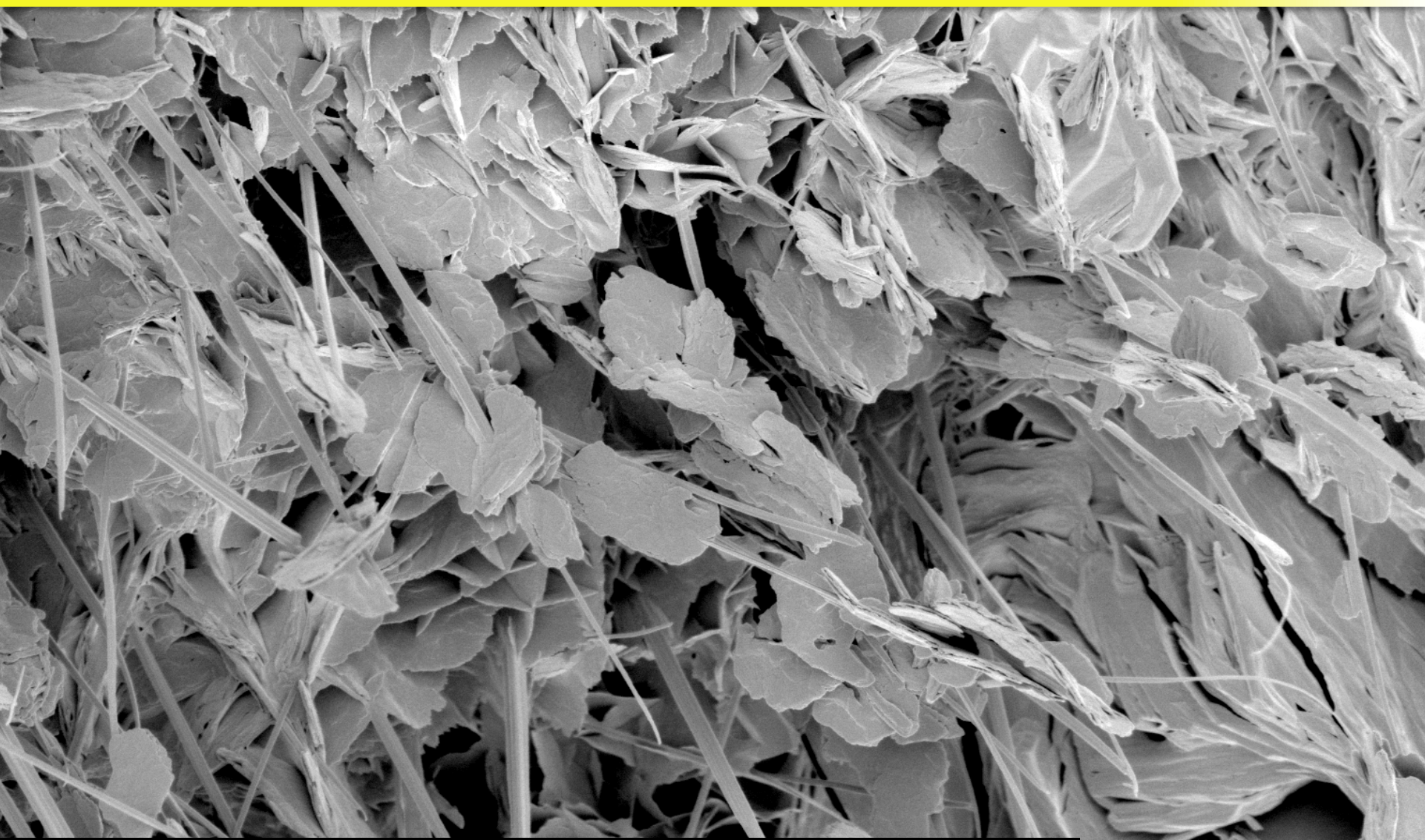


Quantifying carbon sequestration

Mineral abundance data and carbon analyses of MgO powders and magnesium oxychloride boards were used to quantify the amount of sequestered carbon dioxide



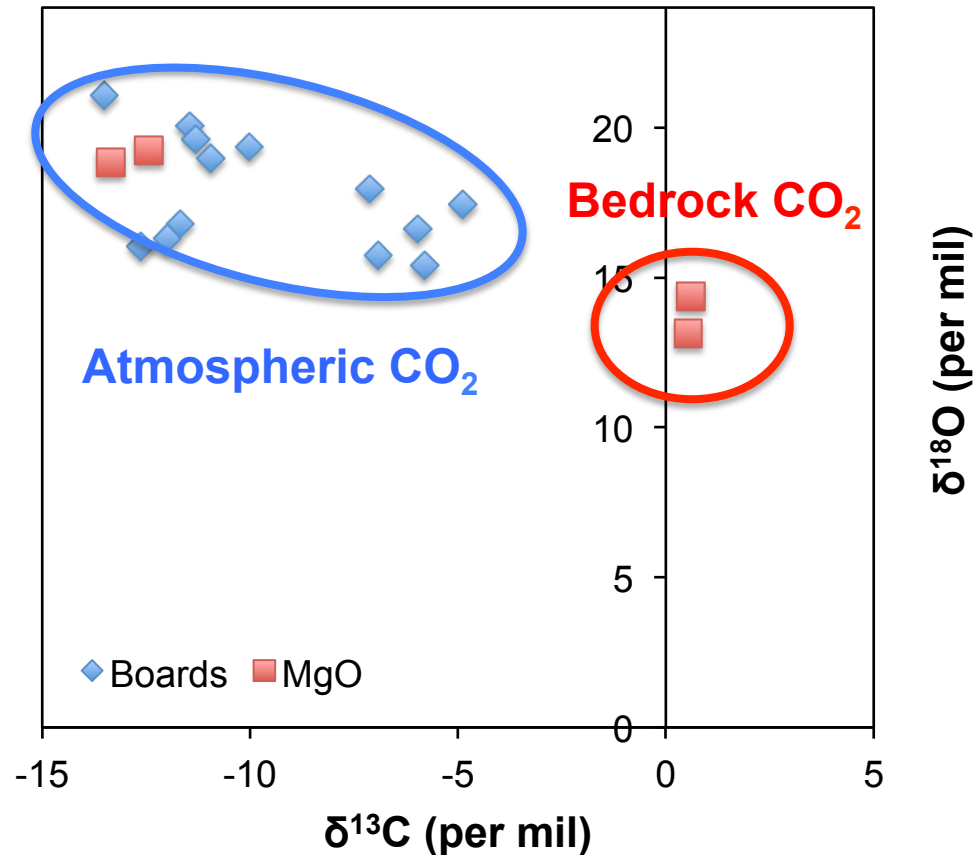
Changes in microstructure



Plates of magnesium carbonate (CO_2 sink) associated with needles of magnesium oxychloride phase 5

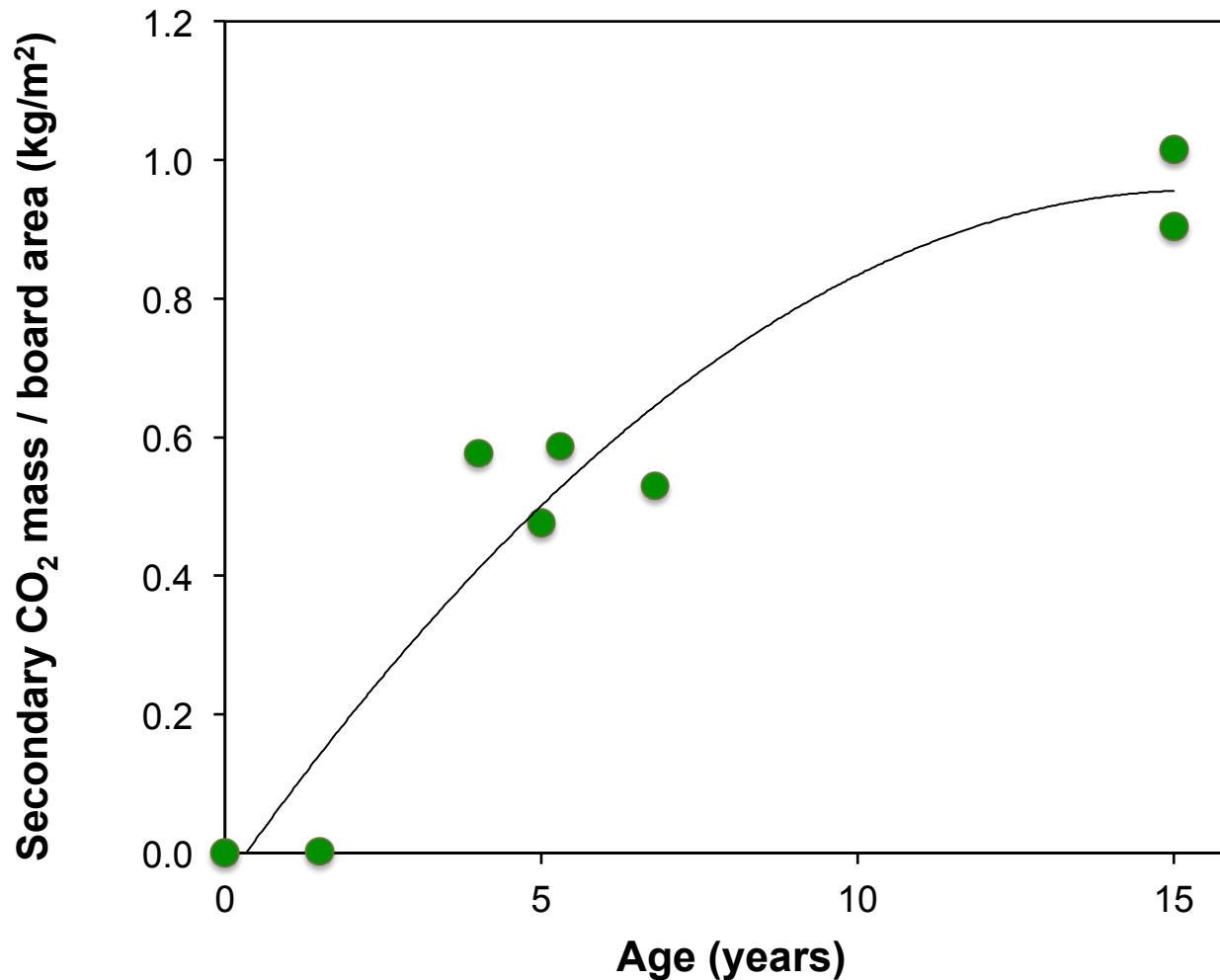
2 μm

Fingerprinting carbon sources



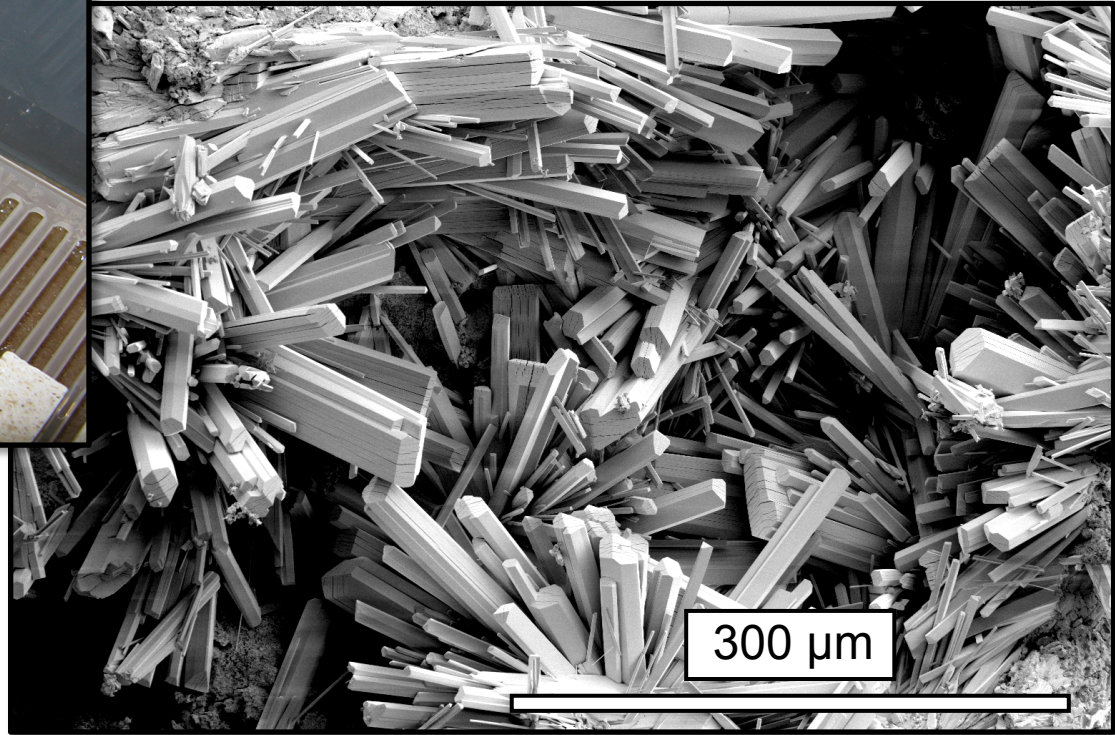
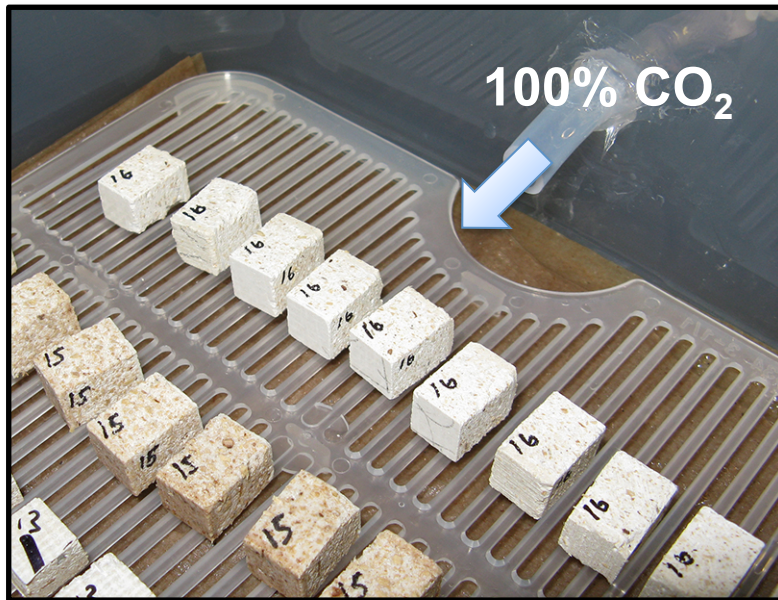
Stable carbon and oxygen isotopic data were used to confirm the sequestration of atmospheric CO_2 within magnesium oxychloride boards

Rate of carbon sequestration



An estimated rate of carbon sequestration within magnesium oxychloride board is 1 kg CO₂/m² of board over 15 years

Carbonation experiment



Storage of boards under 100% relative humidity and 100% CO₂ accelerated rates of carbon sequestration by nearly 1000x