Attachment on mortar surfaces by cyanobacterium Gloeocapsa PCC73106 and sequestration of CO2 by microbially induced calcium carbonate

Tingting Zhu[1], George Arhonditsis[1], Mohamed Merroun[2], and Maria Dittrich[1]

[1]University of Toronto at Scarborough
[2]University of Granada Faculty of Sciences

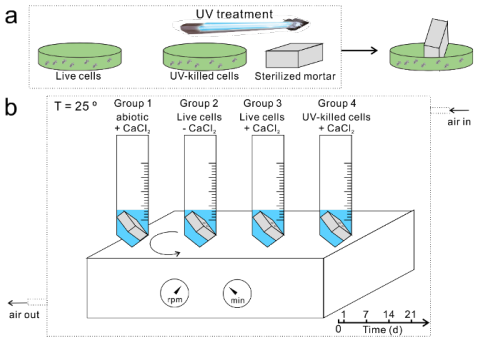
September 16, 2020

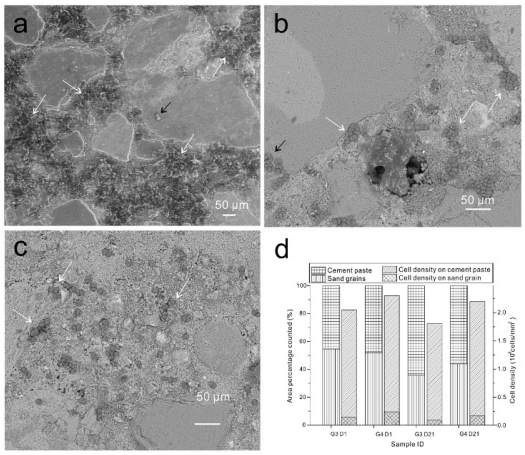
Abstract

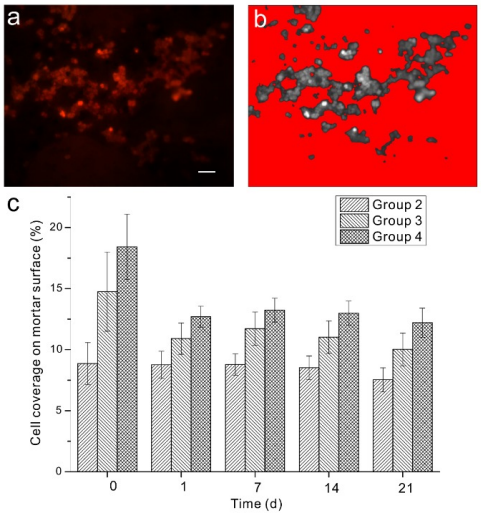
Cyanobacterial carbonate precipitation induced by cells and extracellular polymeric substances (EPS) enhances the mortar durability. The percentage of cell/EPS attachment regulates the effectiveness of the mortar restoration. This study investigates the cell coverage on mortar and microbially induced carbonate precipitation. Statistical analysis of results from scanning electron and fluorescence microscopy show that the cell coverage was higher in the presence of UV-killed cells than living cells. Cells preferably attached to cement paste than sand grains, with a difference of one order of magnitude. The energy dispersive X-ray spectroscopy analyses and Raman mapping suggest cyanobacteria used atmospheric CO2 to precipitate carbonates.

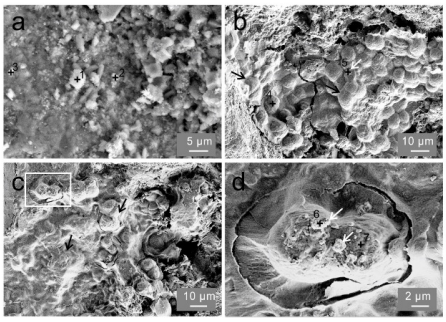
Hosted file

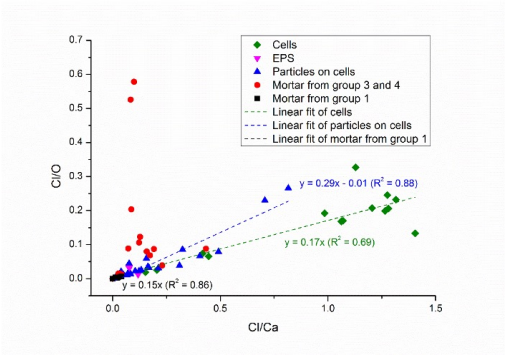
`Biotech-Zhu et al Submission-MainText-md.pdf` available at https://authorea.com/users/359637/articles/481483-attachment-on-mortar-surfaces-by-cyanobacterium-gloeocapsa-pcc73106-and-sequestration-of-co2-by-microbially-induced-calcium-carbonate

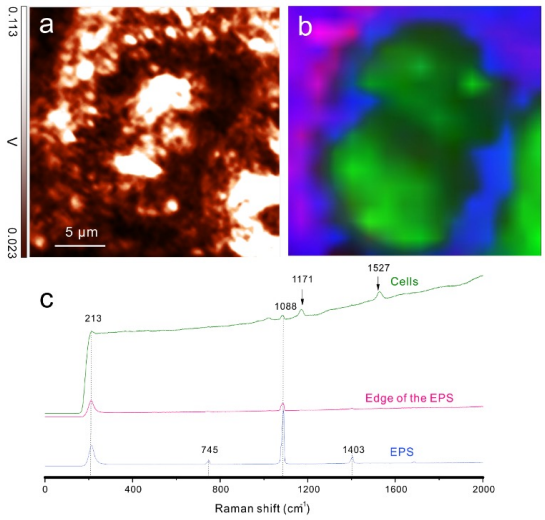












Hosted file

Table123.docx available at https://authorea.com/users/359637/articles/481483-attachment-on-mortar-surfaces-by-cyanobacterium-gloeocapsa-pcc73106-and-sequestration-of-co2-by-microbially-induced-calcium-carbonate