



Contribution ID: 771

Type: Oral Presentation

## Capsule-based biomimetic regulating technique of MICP and its application for soil reinforcement

Friday, June 4, 2021 10:55 AM (15 minutes)

Microbial induced calcium carbonate ( $\text{CaCO}_3$ ) precipitation (MICP) not only plays a dominant role in the carbon cycle but is also a promising technology to create living building materials. However, the short shelf-life, lack of spatial control and limited scalability have hindered their use commercially. To tackle these shortcomings, we herein present a capsule-based biomimetic regulating technique of MICP. The ureolytic bacterium *Sporosarcina pasteurii* is immobilised in hydrogel droplets via extrusion and calcium ion cross-linking, and its controlled release is achieved through competitive displacement of the calcium ions between the polymer and the peptides in the yeast extract. This highlights, for the first time, the potential to program the release of the biochemical machinery of MICP, with the recognition of a component that is inherently specific to the solution used to promote bacterial growth. Our concept, integrating MICP with soft materials for controlled dynamic metabolic response and calcium carbonate mineral microstructure, is finally demonstrated in soil specimens to showcase its applicability in the context of soil reinforcement. This platform technology constitutes a step change in the design of functional living building materials that can sense, respond, and heal.

### Time Block Preference

Time Block A (09:00-12:00 CET)

### References

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### Newsletter

### Student Poster Award

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**Track Classification:** (MS5) Biochemical processes and biofilms in porous media