

## **The effect of extracellular polymeric substances secreted by G<sup>+</sup> and G<sup>-</sup> bacteria on precipitation of carbonate minerals**

FUCHUN LI\*, WEN QIN, LEI LI, CHONGHONG ZHANG,  
JIEJIE LV

Nanjing Agricultural University, Nanjing, China  
(\*correspondence: fchli@njau.edu.cn)

Microbial induced carbonate precipitation is one of the most important ways for sequestration of atmospheric CO<sub>2</sub>. Previous results have shown that both bacterial cells and extracellular polymeric substances (EPS) secreted by bacteria could affect mineral nucleation, regulate mineral phase and morphology. In order to clarify whether EPS affect precipitation of carbonate minerals, and to discuss its mechanism in the presence of bacteria, mineralization experiments were carried out in the systems with EPS secreted by gram-staining positive (G<sup>+</sup>) *Arthrobacter* sp. MF-2 stain and gram-staining negative (G<sup>-</sup>) *Curvibacter* sp. HJ-1 stain, respectively, and without EPS.

The experimental results showed that the weights of precipitate in the early stage in the system with EPS secreted by MF-2 stain were lower than that in the CK experiments without EPS, while Ca<sup>2+</sup> concentrations were higher than that in the CK. In the late stage, both the weights of precipitate and Ca<sup>2+</sup> concentrations tended to be the same. However, for the experiments with EPS secreted by stain HJ-1, the precipitate weights were higher than that in the CK experiments without EPS during the experiment, while the Ca<sup>2+</sup> concentrations were lower than in the CK. These results imply that EPS secreted by G<sup>+</sup> and G<sup>-</sup> bacteria could inhibit and promote the nucleation of carbonate minerals, respectively. This work was supported by the National Natural Science Foundation of China (grant Nos: 41673083 and 41172308).