

Supporting Information

Experimental and geochemical simulation of nickel carbonate mineral precipitation by carbonate-laden ureolytic fungal culture supernatants

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Methods

Quantification of polysaccharides produced by fungi

The concentration of polysaccharide in fungal supernatant before and after mixture with NiCl_2 solution was measured using the Phenol-Sulfuric acid method, following the basic protocol of Dubois et al.¹.

Table S1. Proportion of polysaccharide removed after mixture of fungal growth supernatant and 50 mM NiCl_2 .

Mixture ratio ($V_s : V_m$)	Removal of polysaccharide (%)	
	1% inoculation	10% inoculation
5:0.5	5.4	8.0
7.5:0.5	6.8	7.9
10:0.5	7.4	8.2

Table S2. Elemental composition of fungal growth supernatant and minerals precipitated.

Sample	Elemental Composition (%)			
	C	N	Ni	O
Fungal supernatant (S)	52.97	11.31	-	35.72
$\text{S} + \text{Ni}^{2+}$	47.88	16.85	4.51	30.76

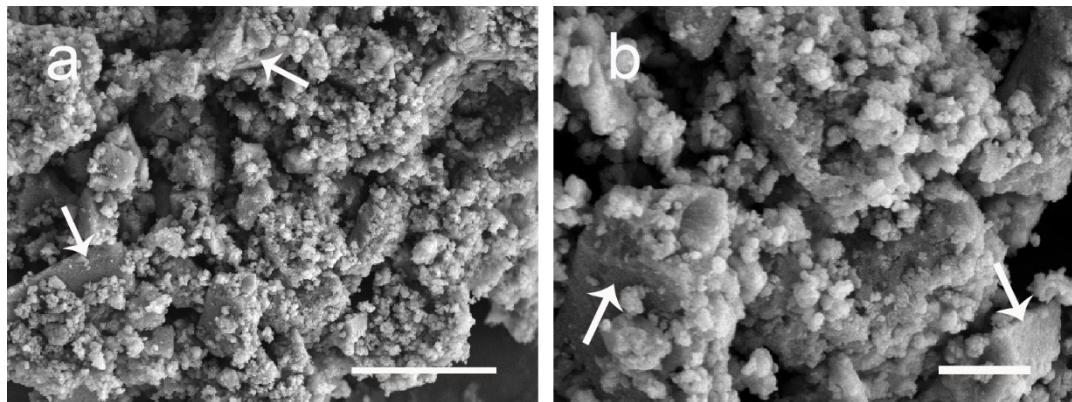


Fig. S1. Scanning electron microscopy and elemental analysis of minerals precipitated by the mixture of NiCl_2 and $(\text{NH}_4)_2\text{CO}_3$.

Minerals were formed by mixture of 0.5 ml 50 mM NiCl_2 and 10 ml AP1 medium containing (a) 33 mM, (b) 330 mM $(\text{NH}_4)_2\text{CO}_3$. Scale bars: (a) = 3 μm , (b) = 600 nm.

Reference

1. M. Dubois, K. A. Gilles, J. K. Hamilton, P. t. Rebers and F. Smith, *Anal Chem*, 1956, **28**, 350-356.