

The biogeochemistry of gold

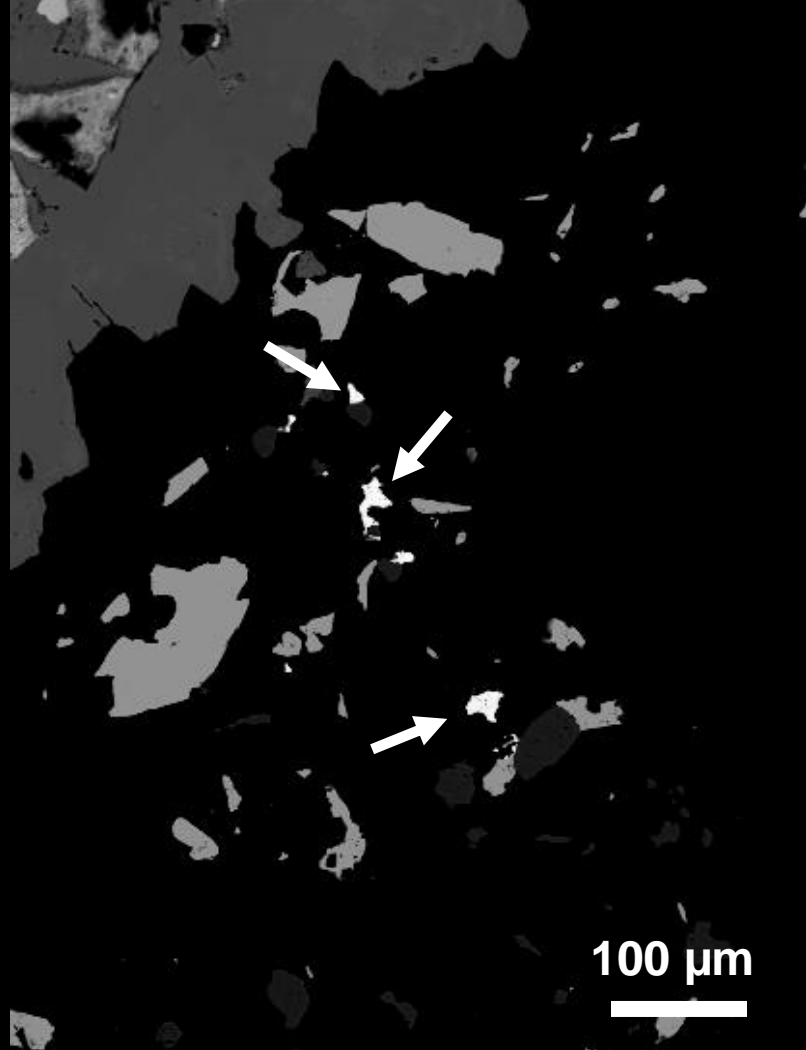
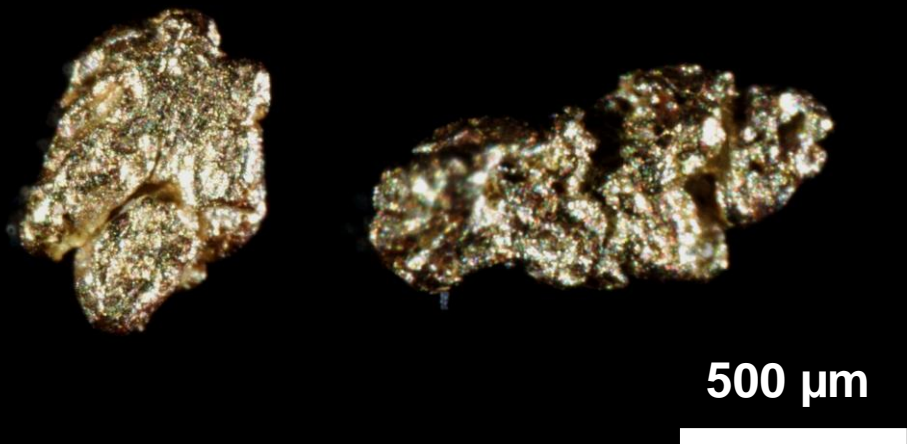
Gordon Southam

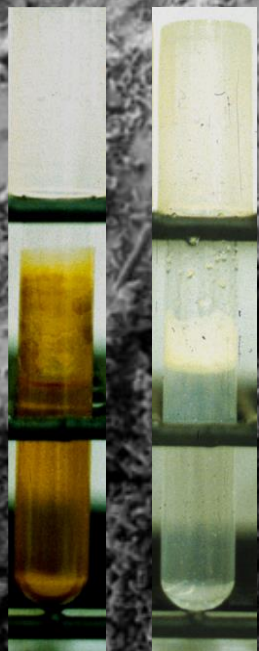
School of Earth &

Environmental Sciences

The University of Queensland

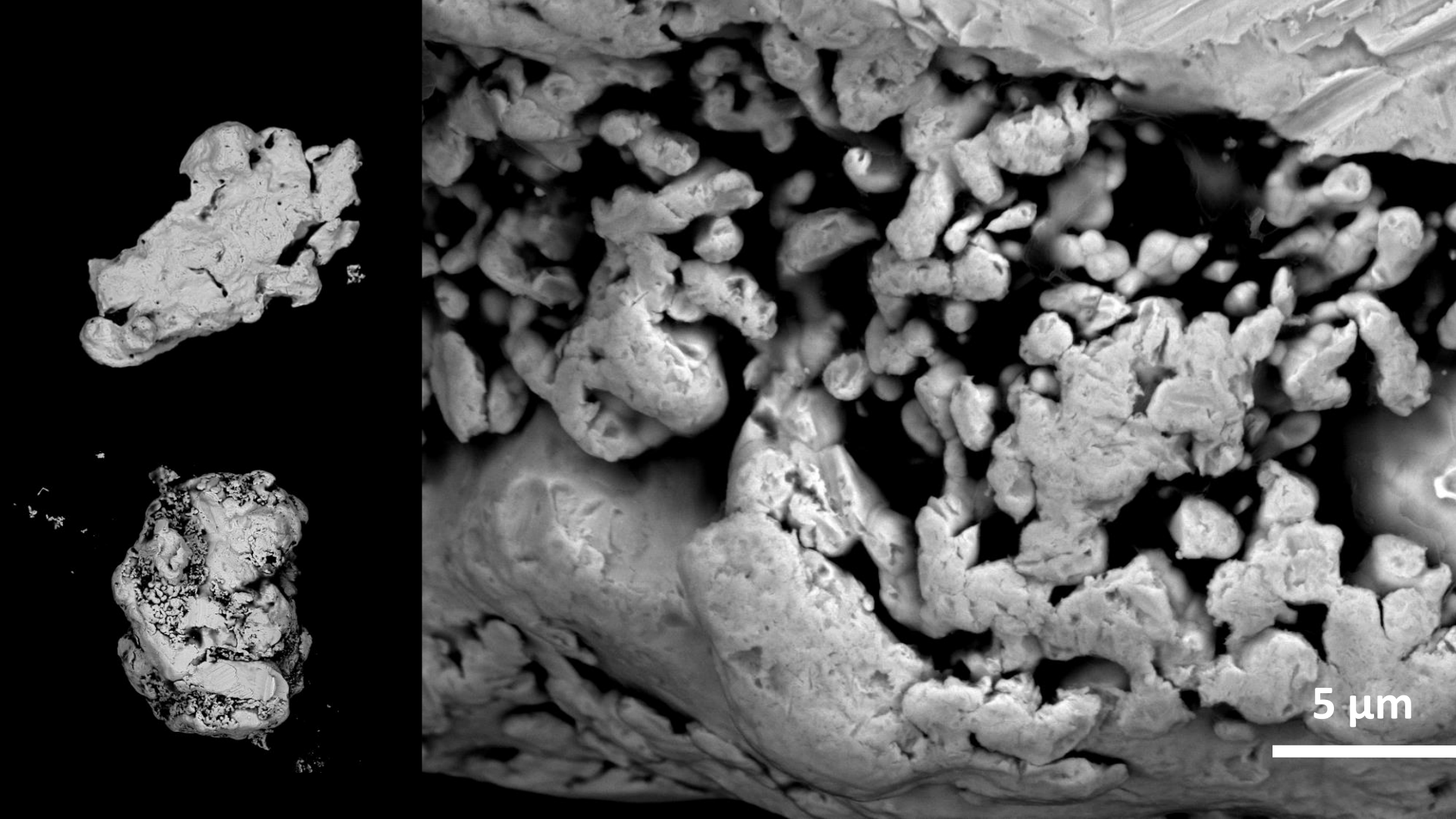
**Placer gold
San Luis Range, Argentina
(Márquez-Zavalía et al., 2004)**



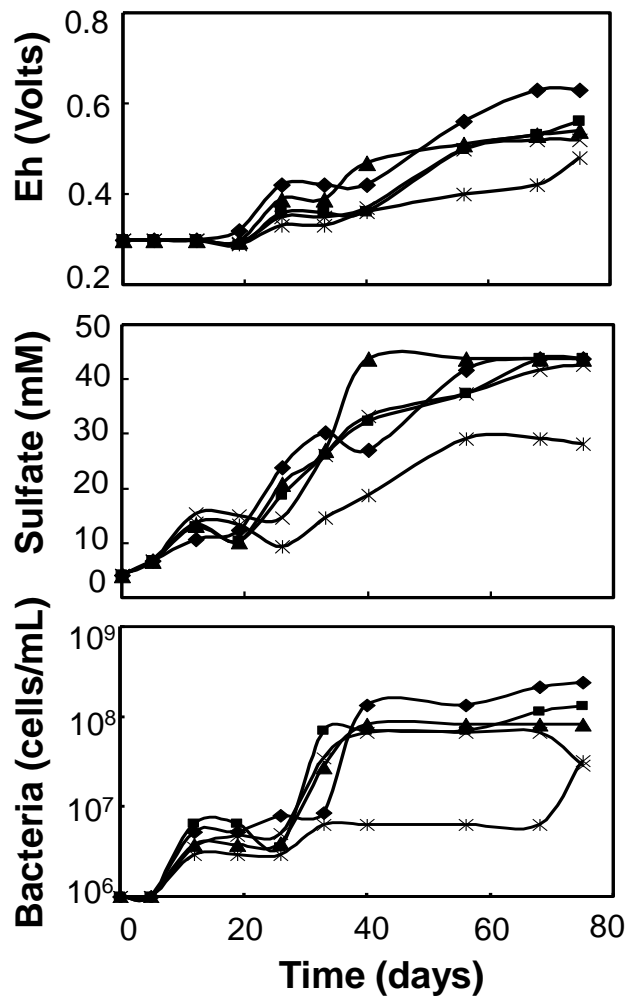
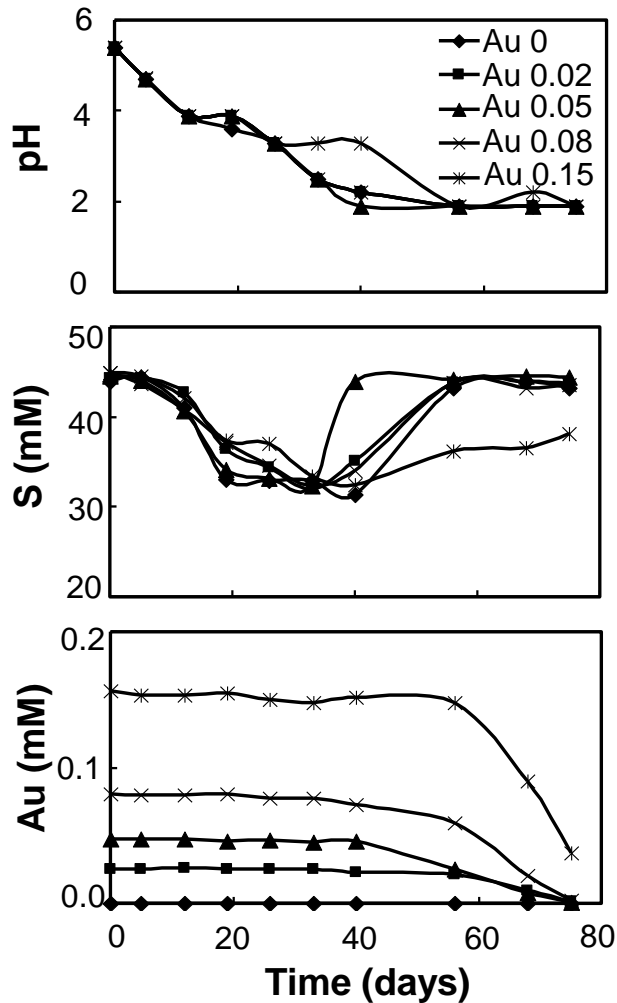


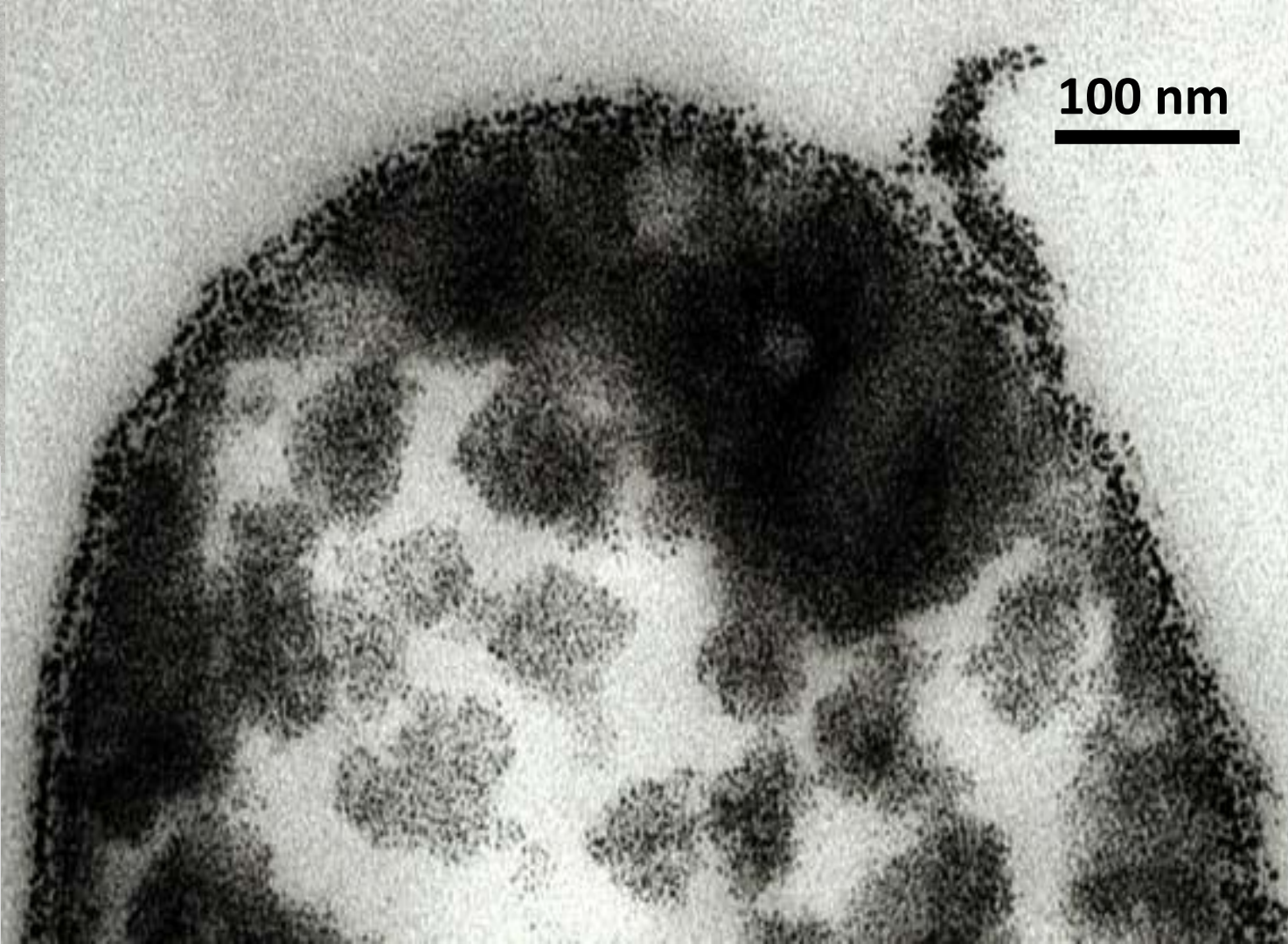
10 μm





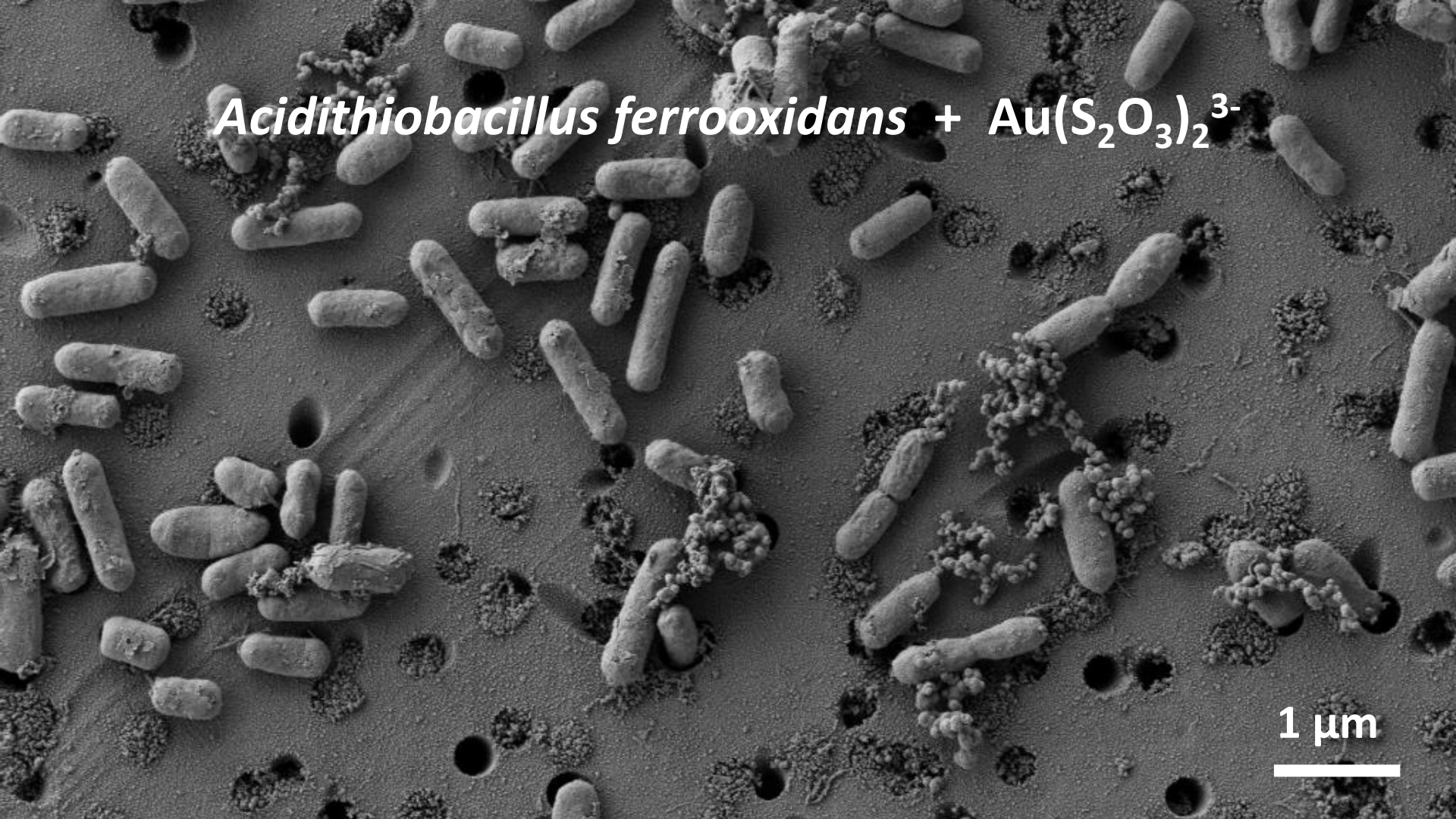
***Acidithiobacillus
thiooxidans***
 **$S_2O_3^{2-} /$
 $Au(S_2O_3)_2^{3-}$**
**(Lengke et al.,
2005)**

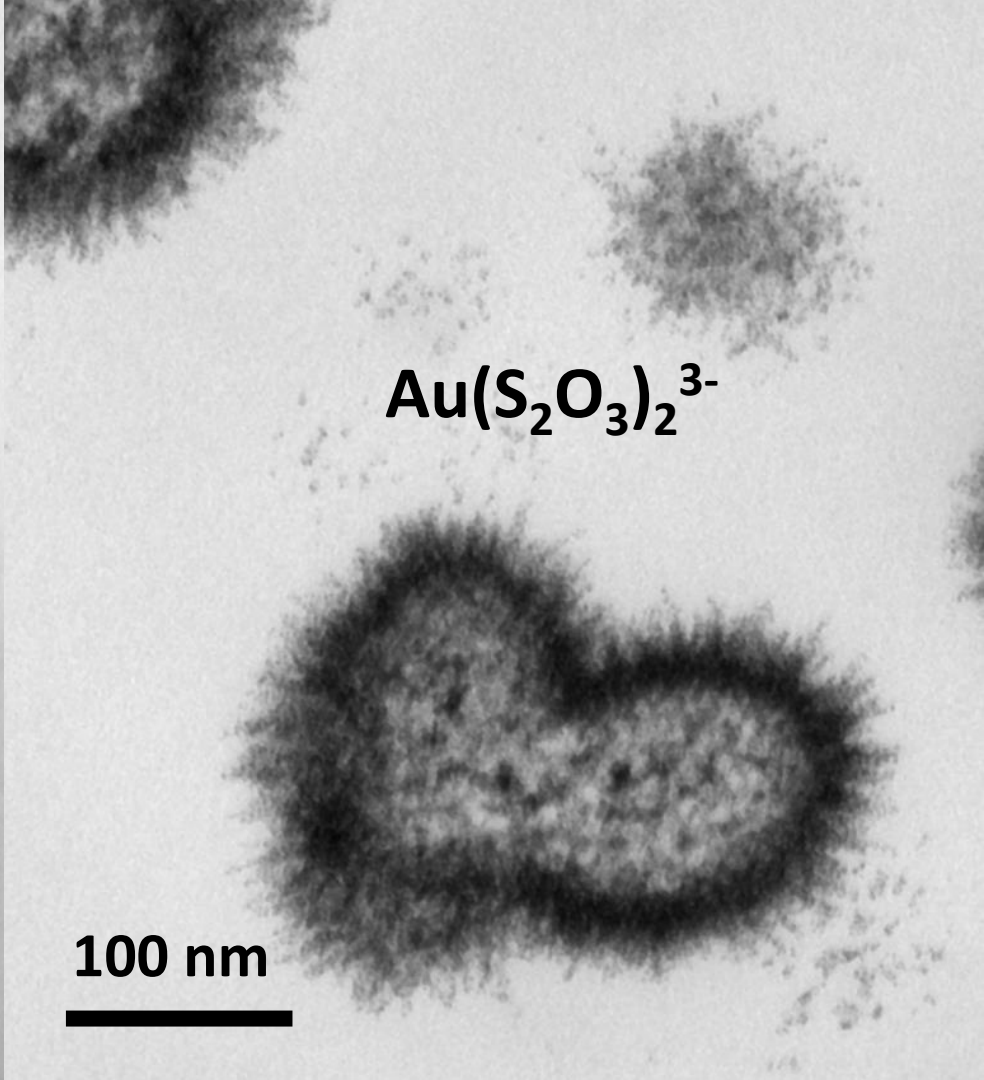
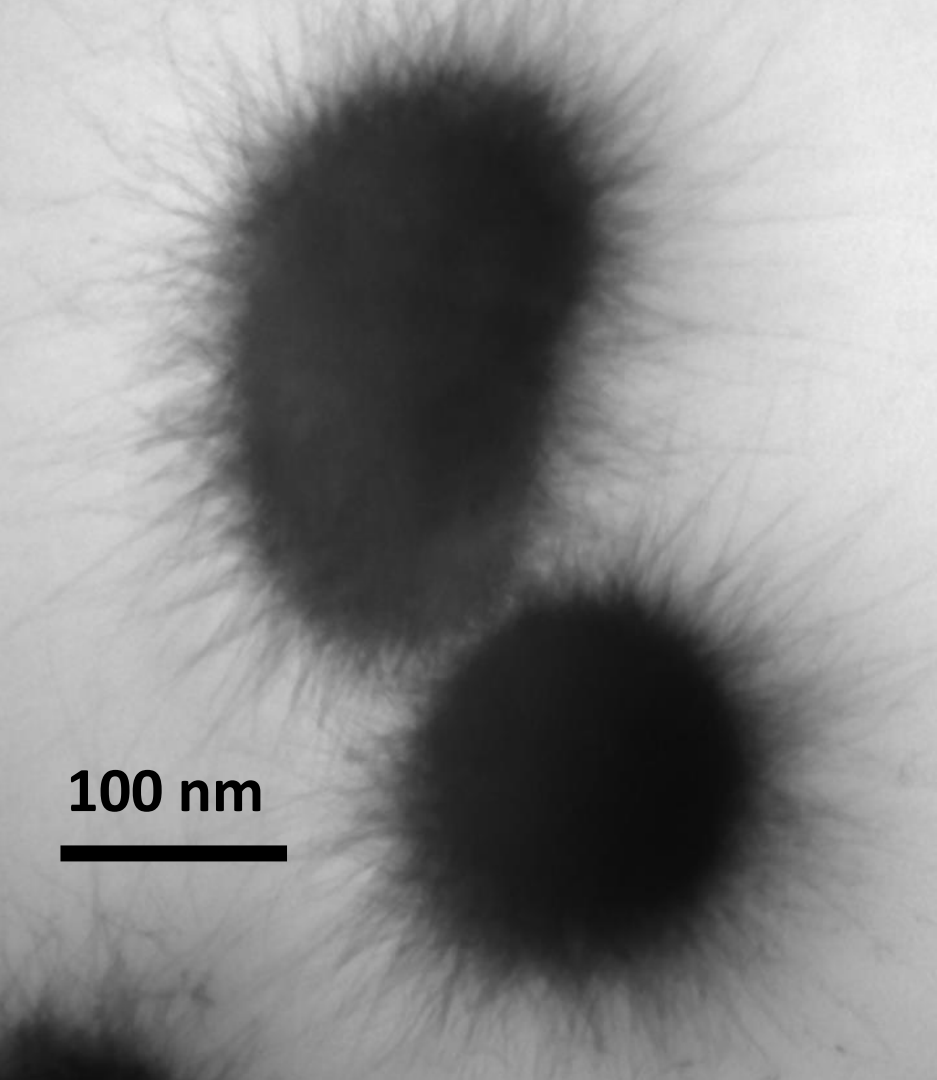


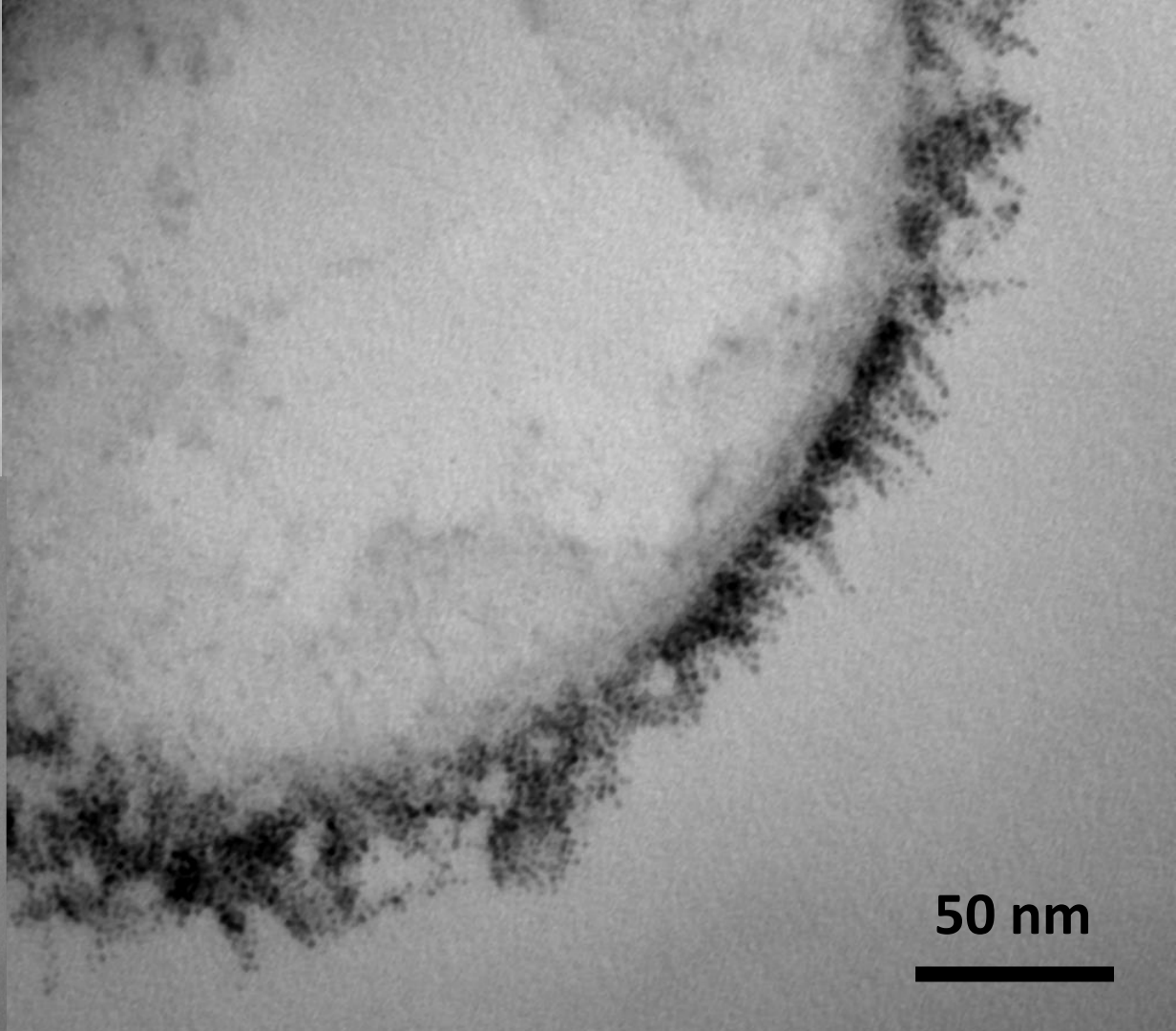
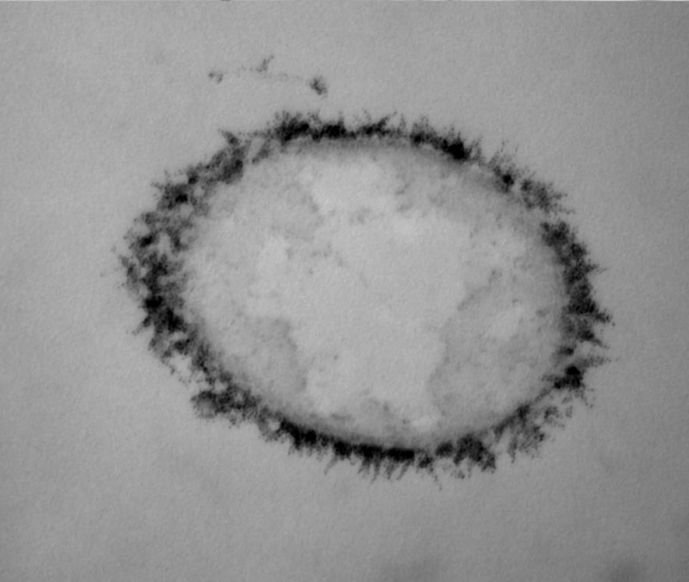
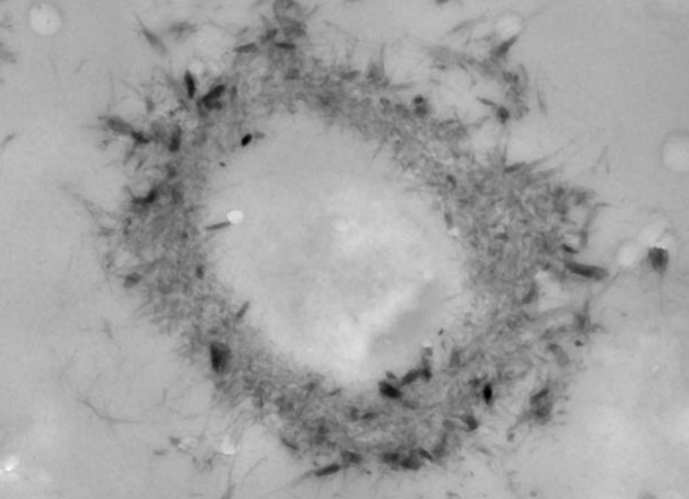


Acidithiobacillus ferrooxidans + $\text{Au}(\text{S}_2\text{O}_3)_2^{3-}$

1 μm







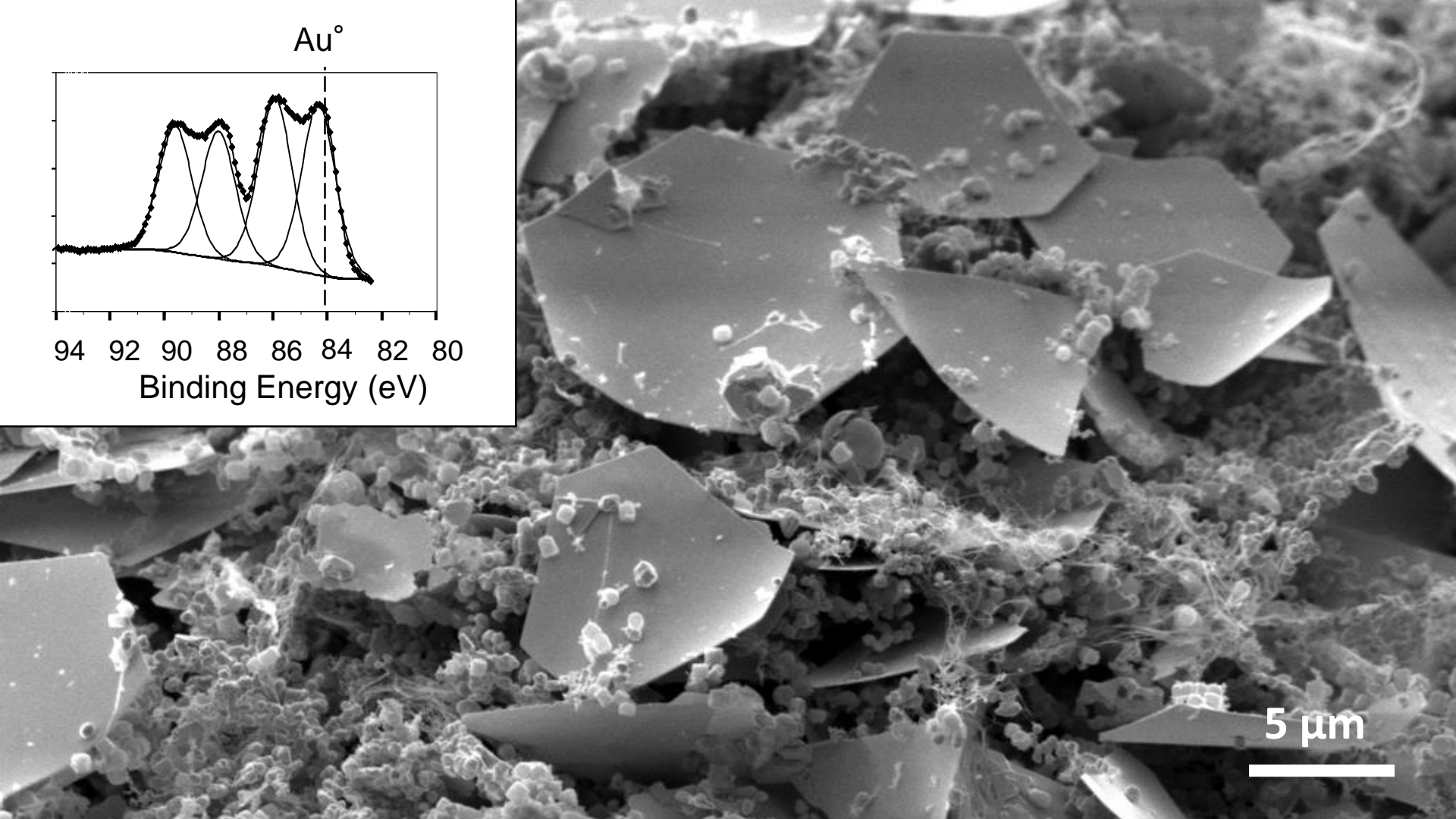
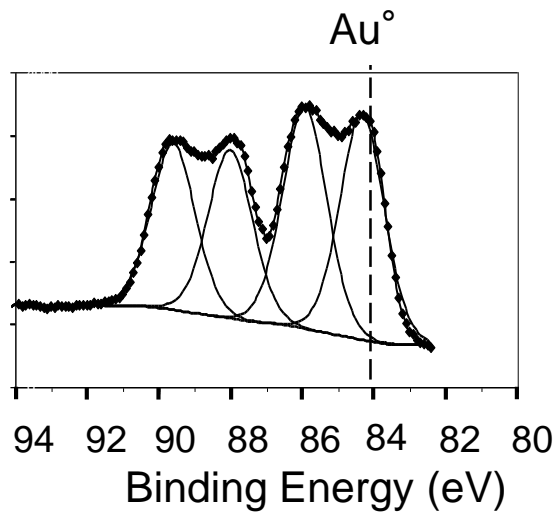
50 nm



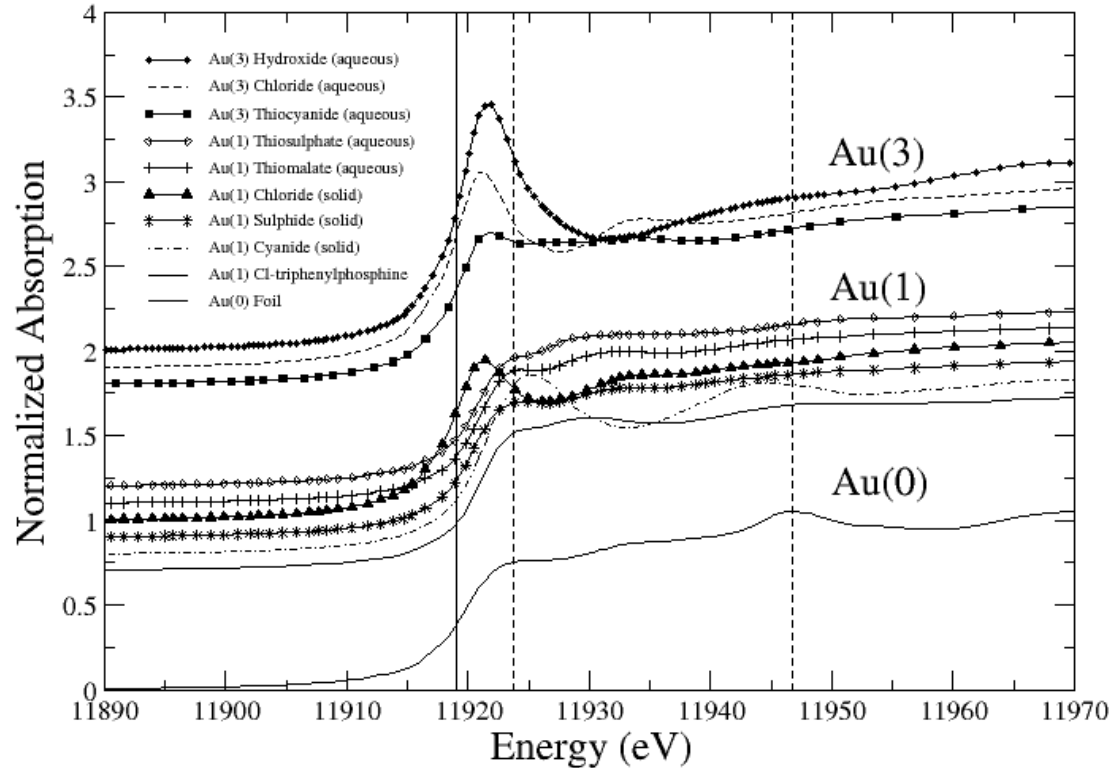
Plectonema boryanum UTEX 485 + Au(III) chloride
(Lengke et al., 2006)

1 μm



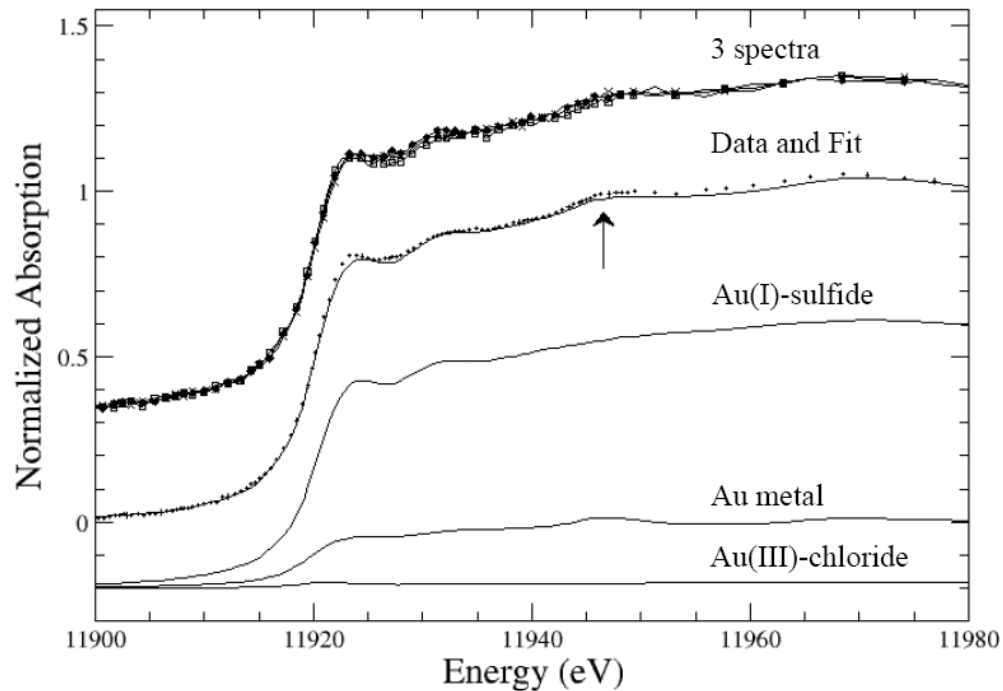


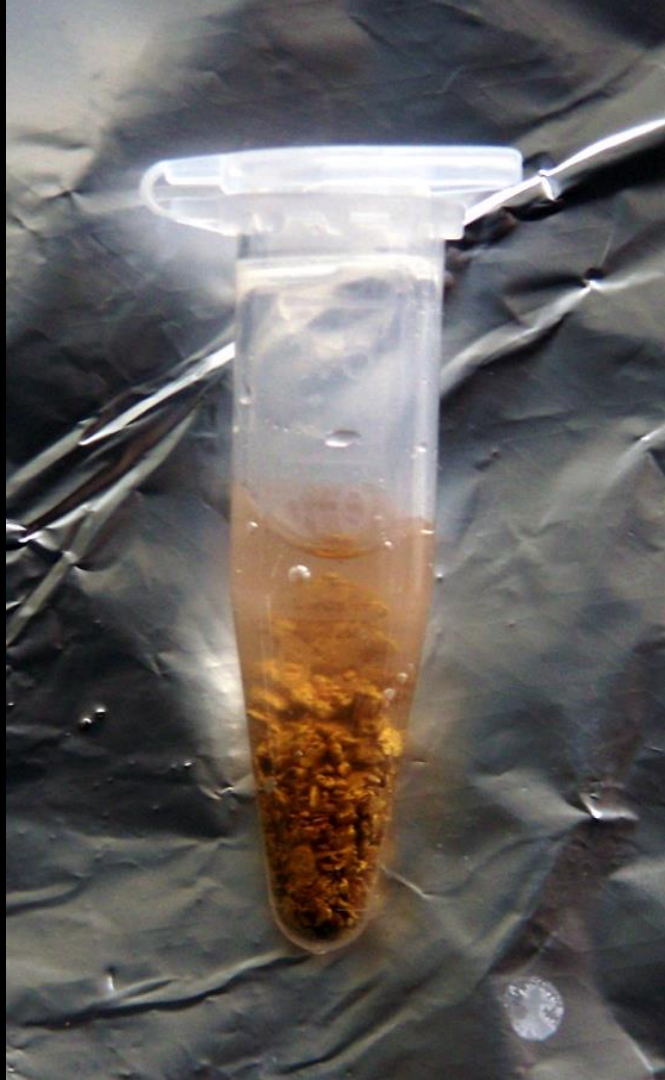
Synchrotron Methods; XANES/EXAFS

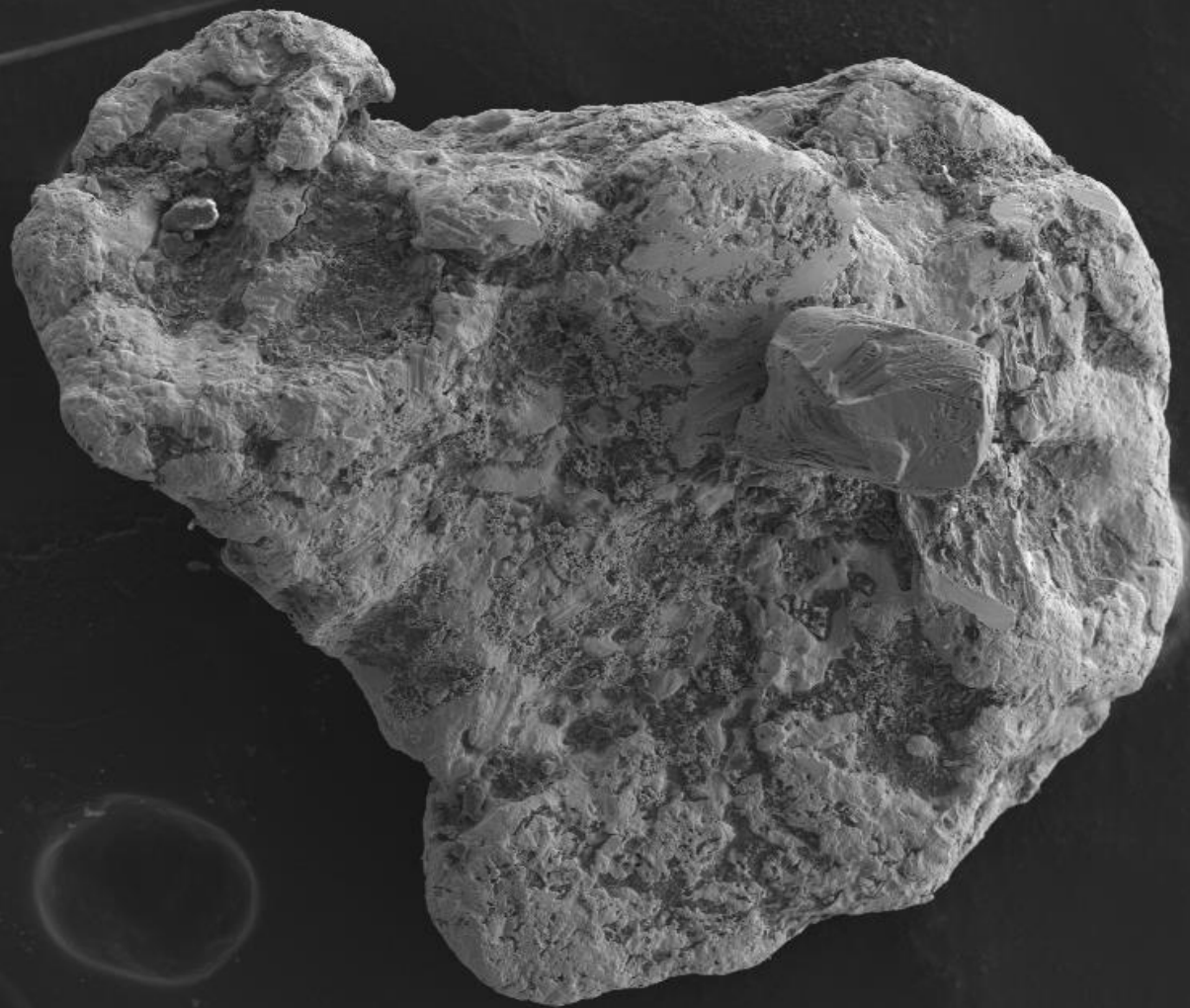


0.8 mM $\text{HAuCl}_4 \cdot 3\text{H}_2\text{O}$

(150 ppm Au^{3+} + 20 mg/ml *Plectonema boryanum*)

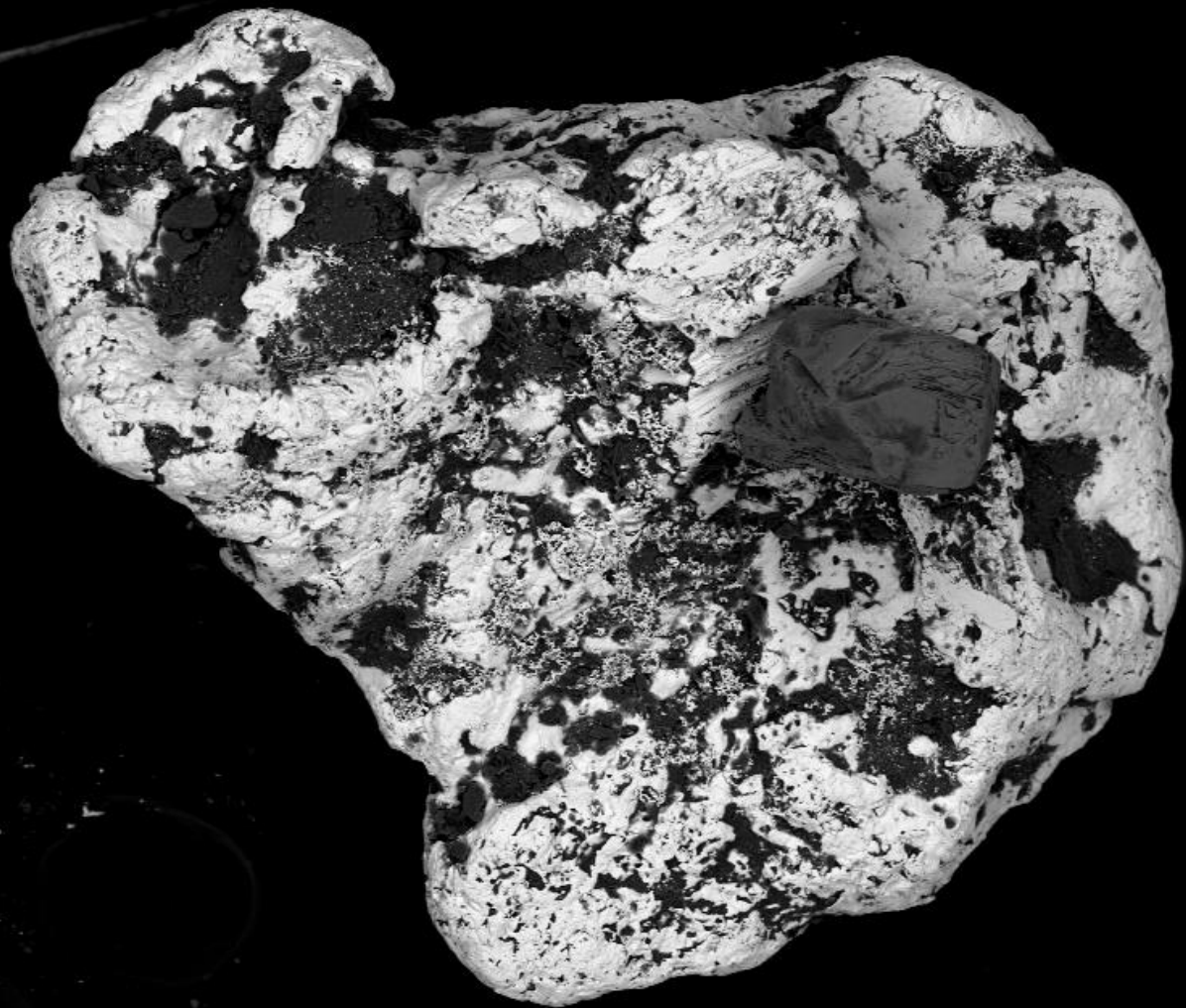






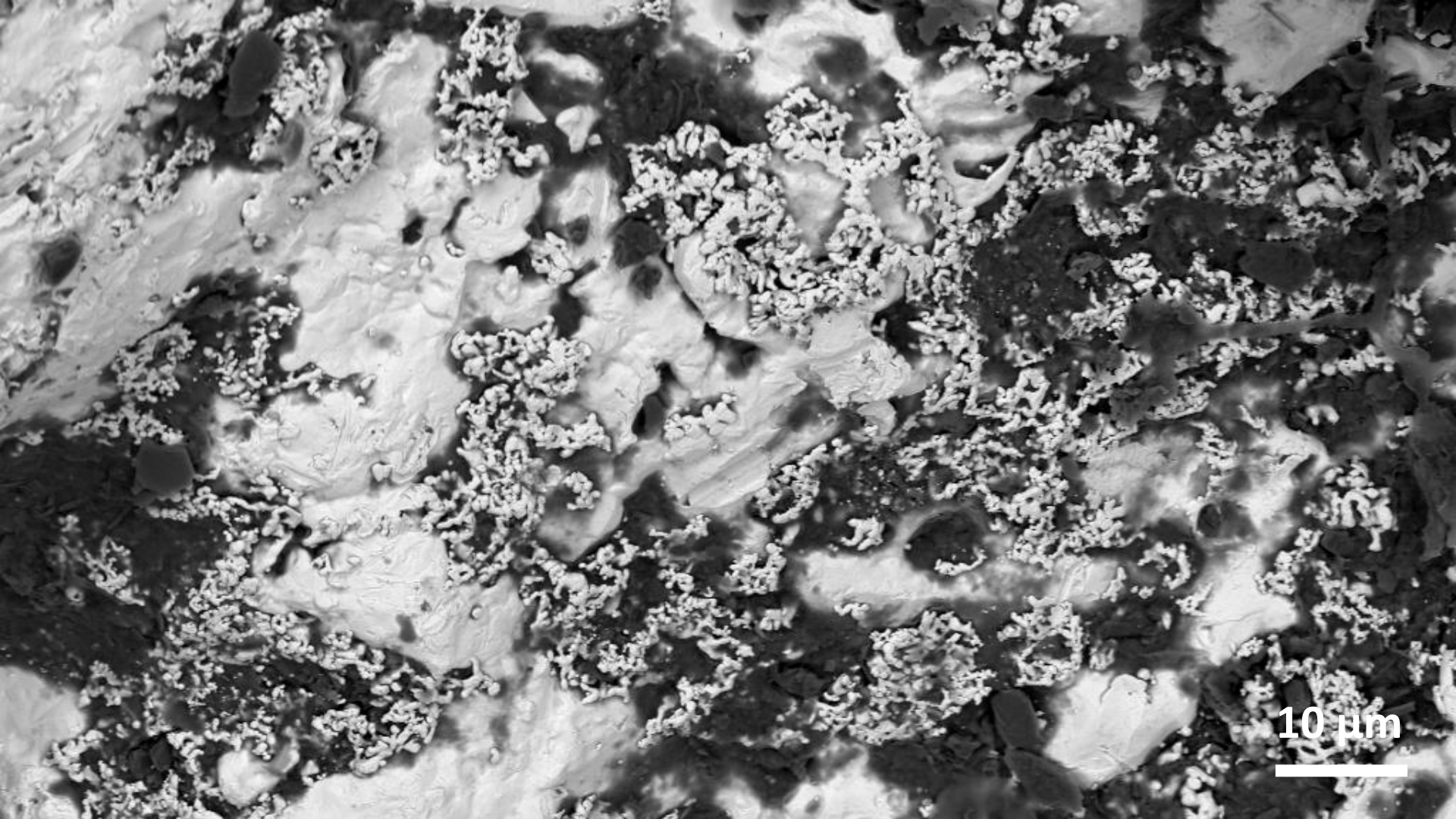
50 μm





50 μm



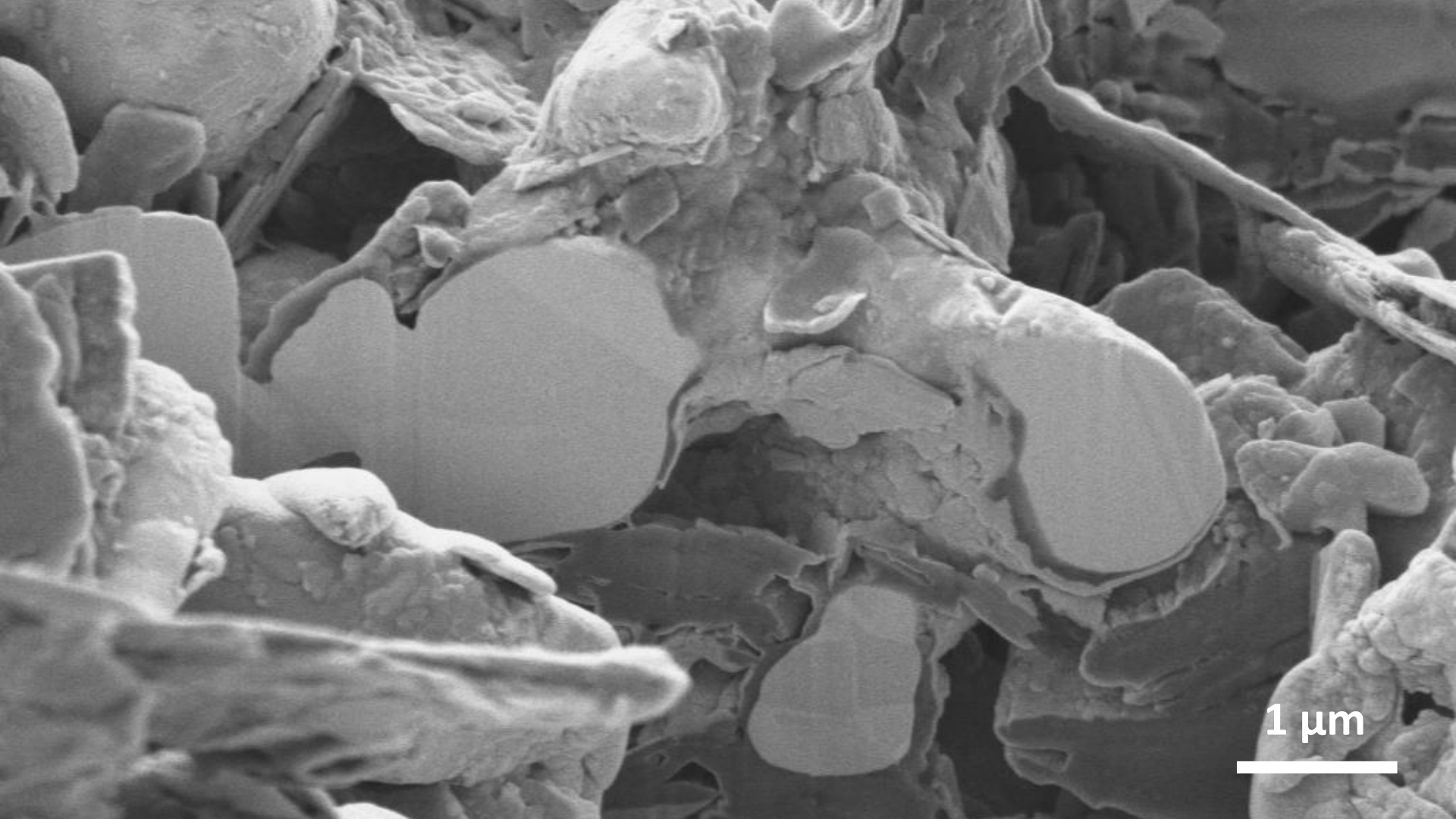




5 μm

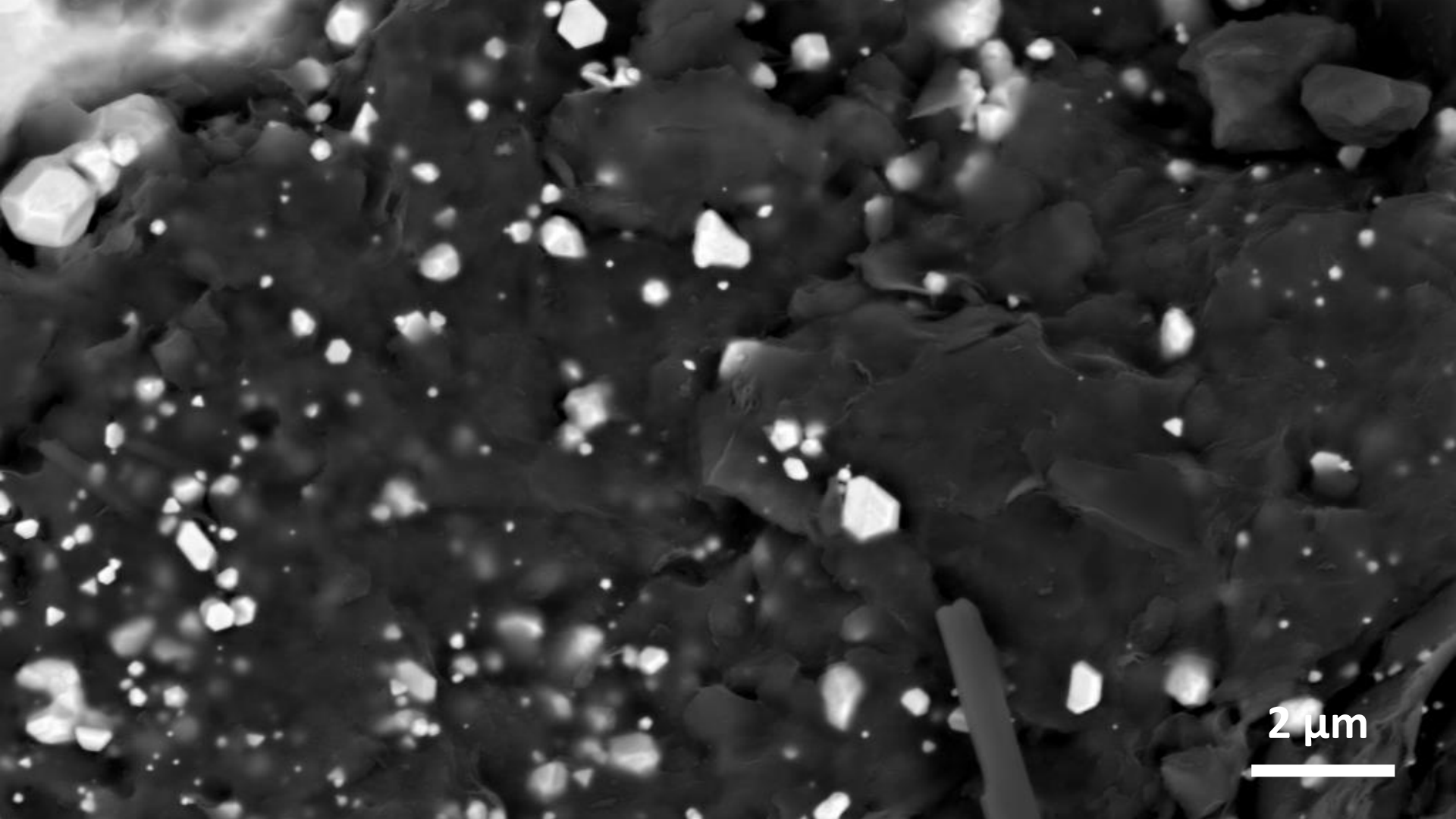


1 μm

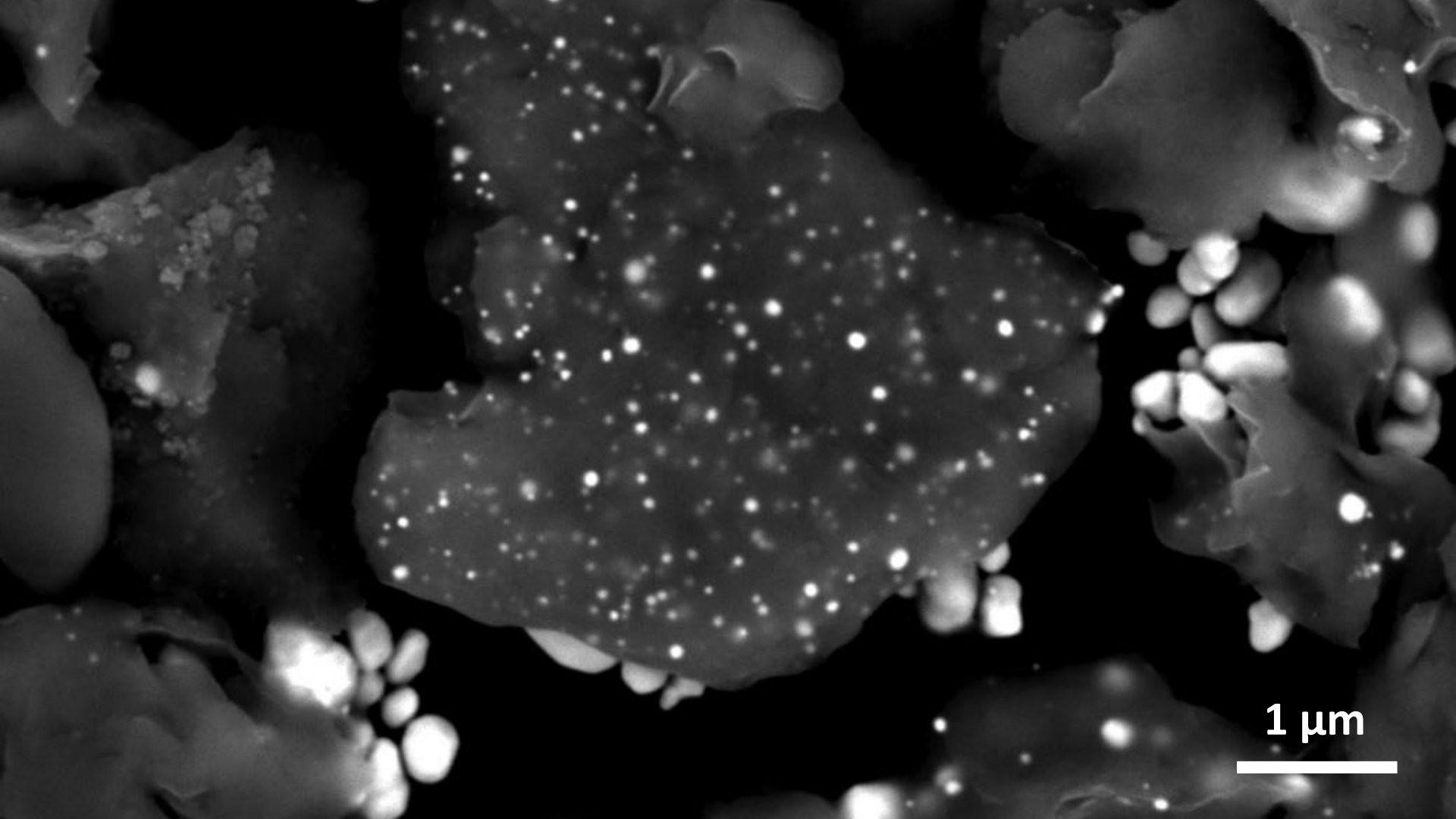


1 μm

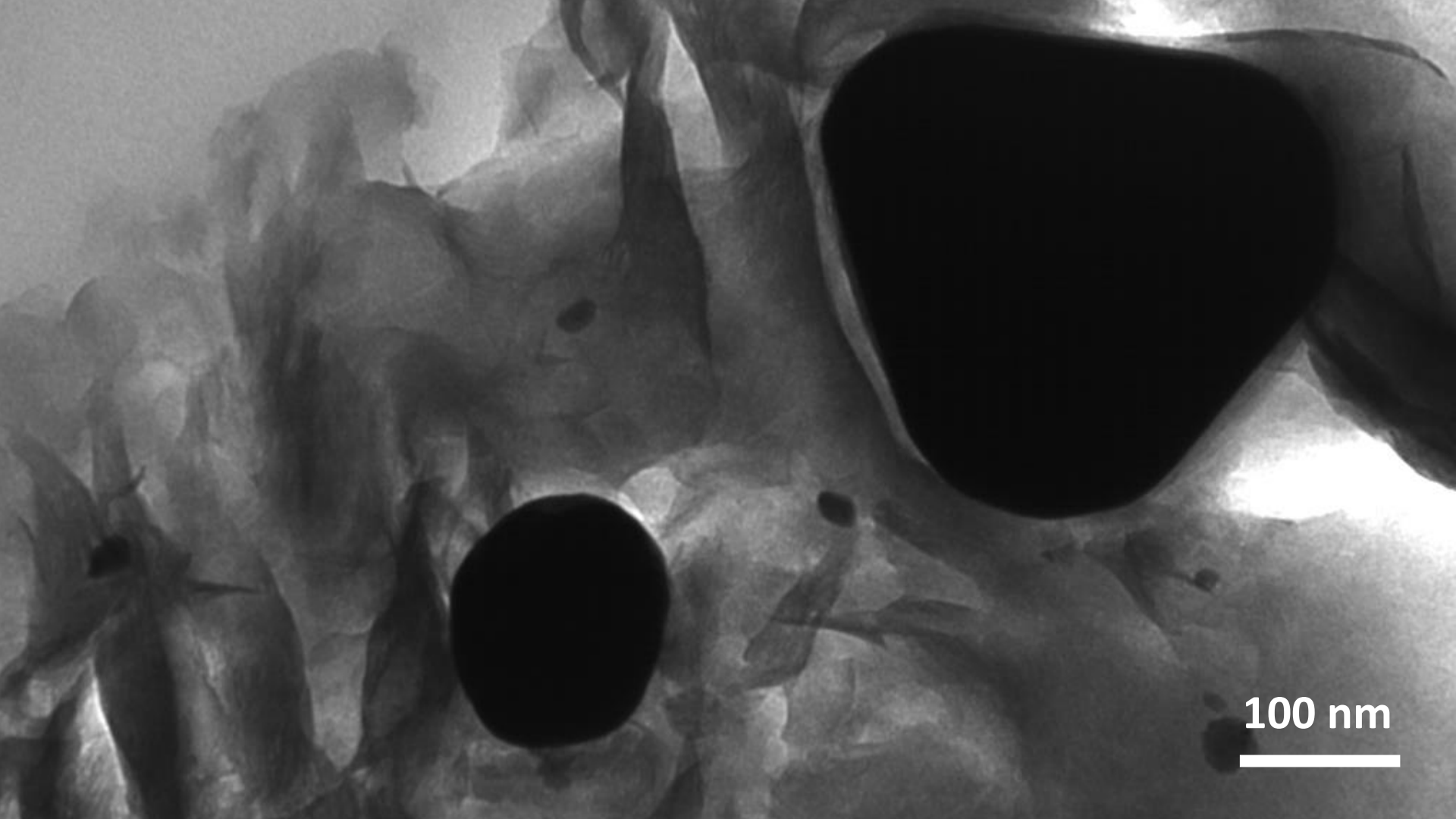




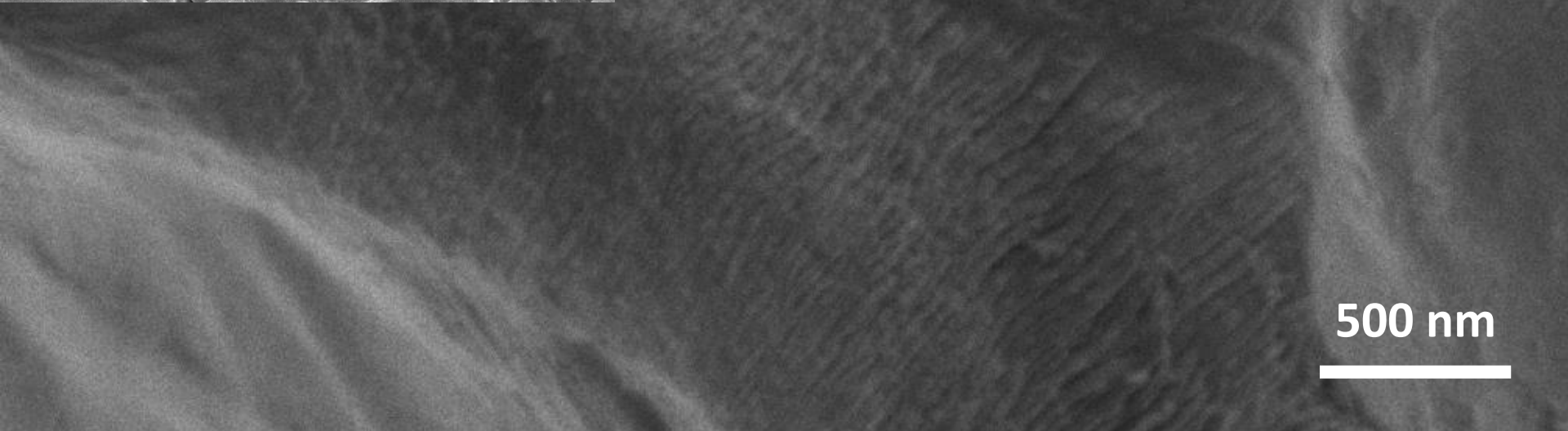
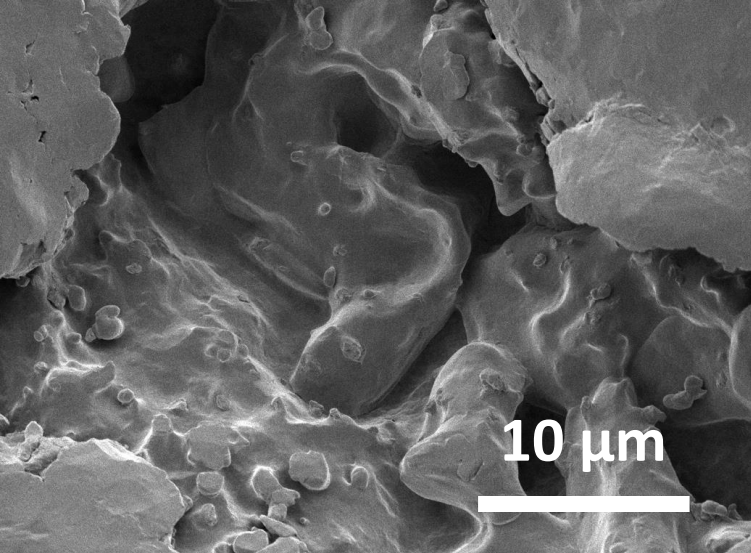
2 μm



1 μm

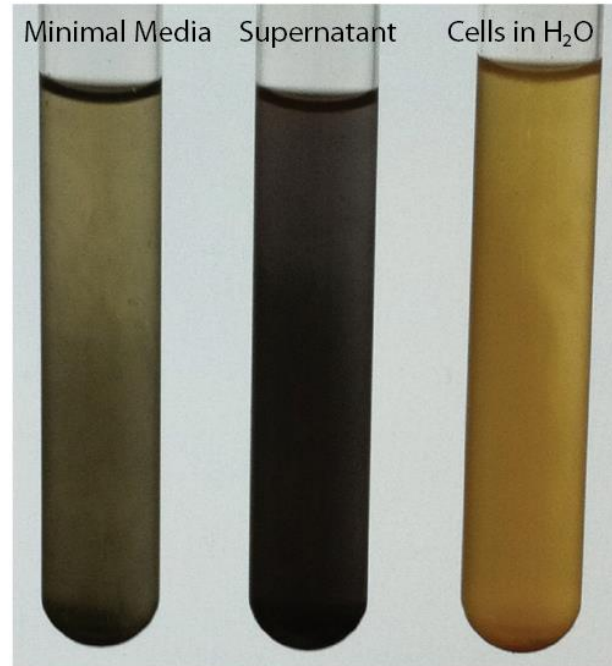
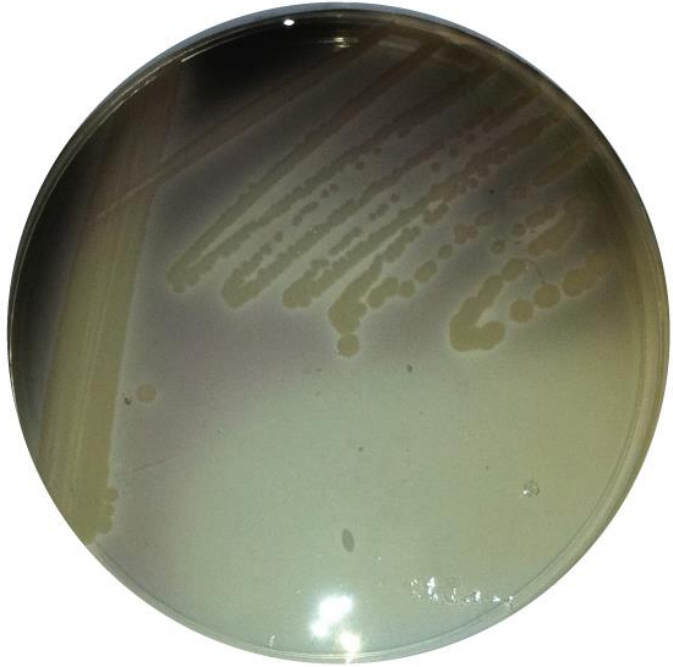


100 nm

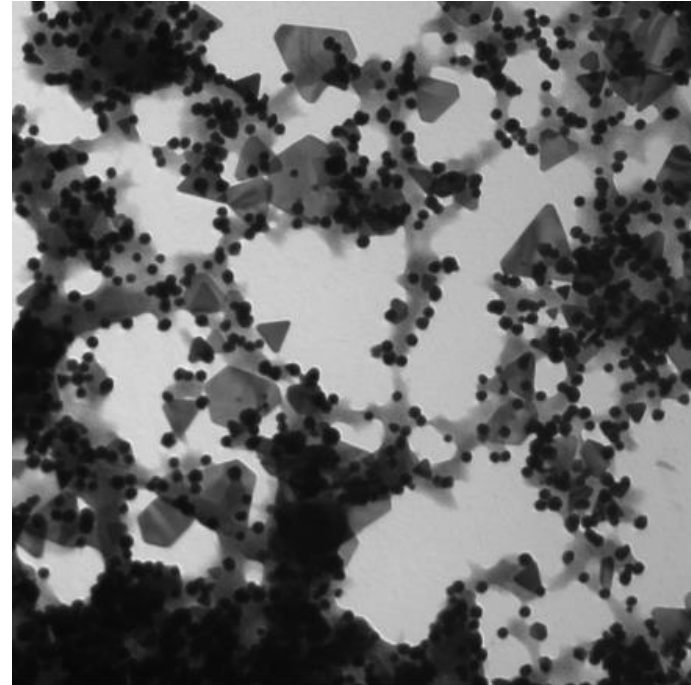
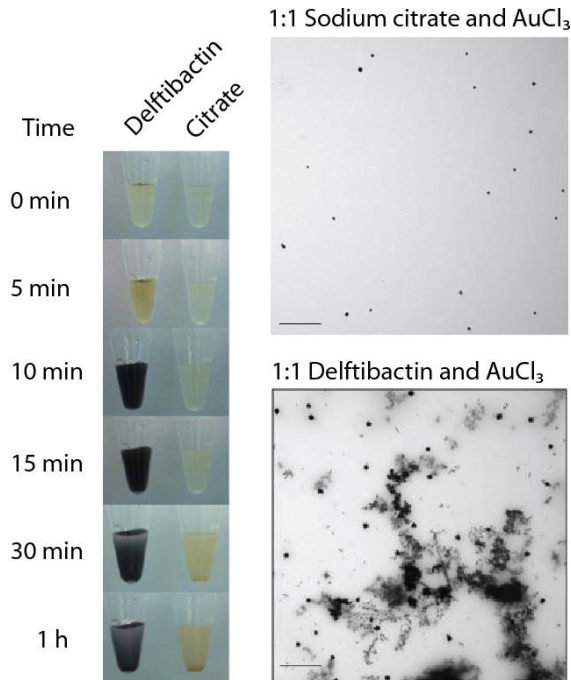


Delftibacter acidovorans; Delftibactin

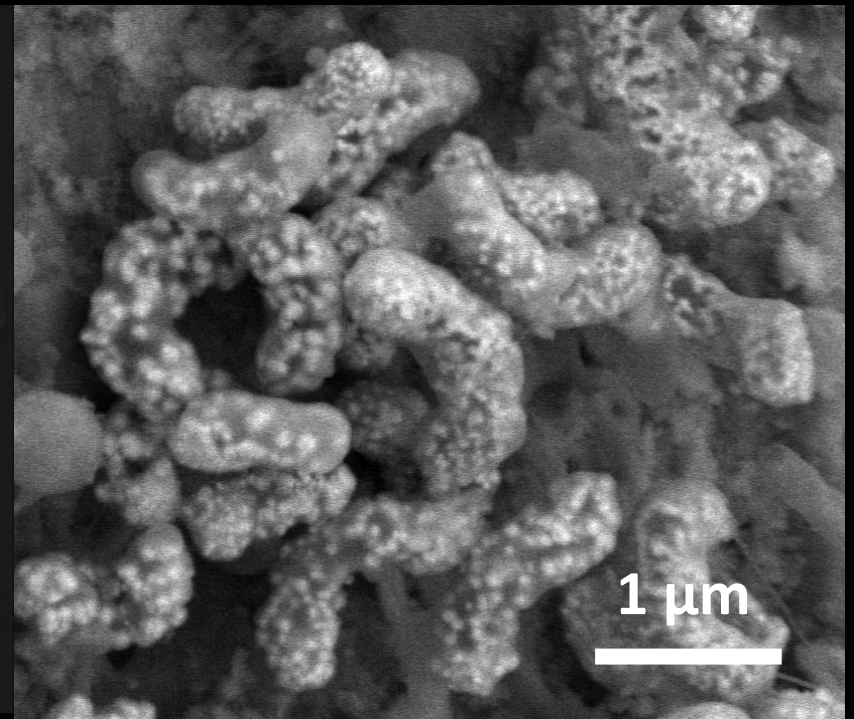
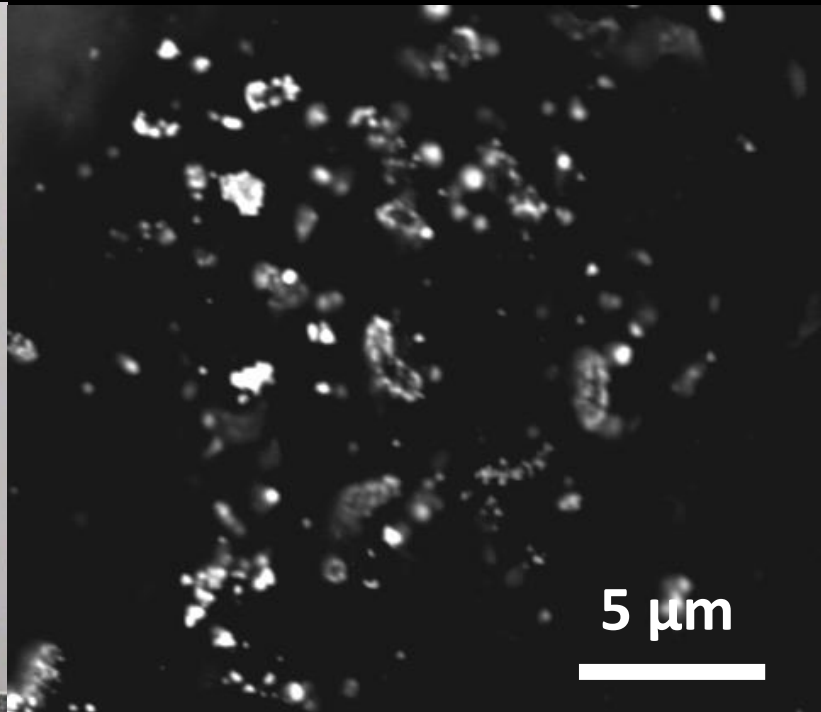
(Johnston et al., 2013)

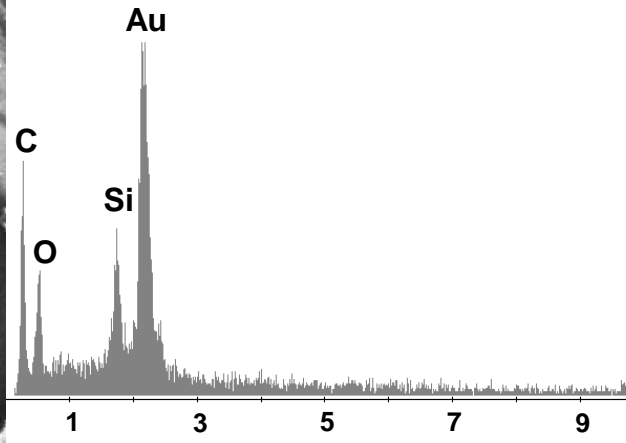
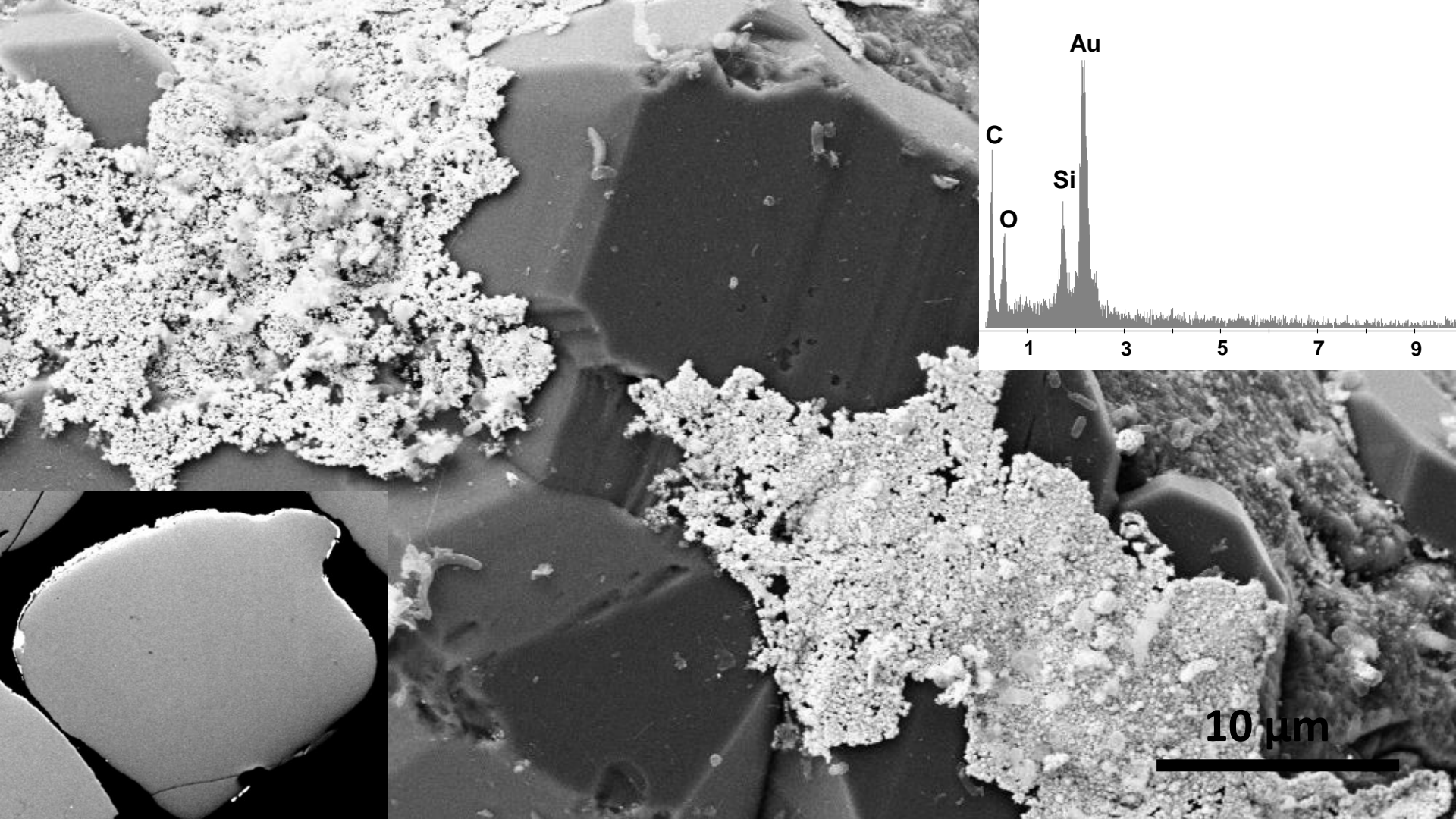


Gold biomineralization by a metallophore from a gold-associated microbe (*Delftia acidovorans* – Delftibactin A)

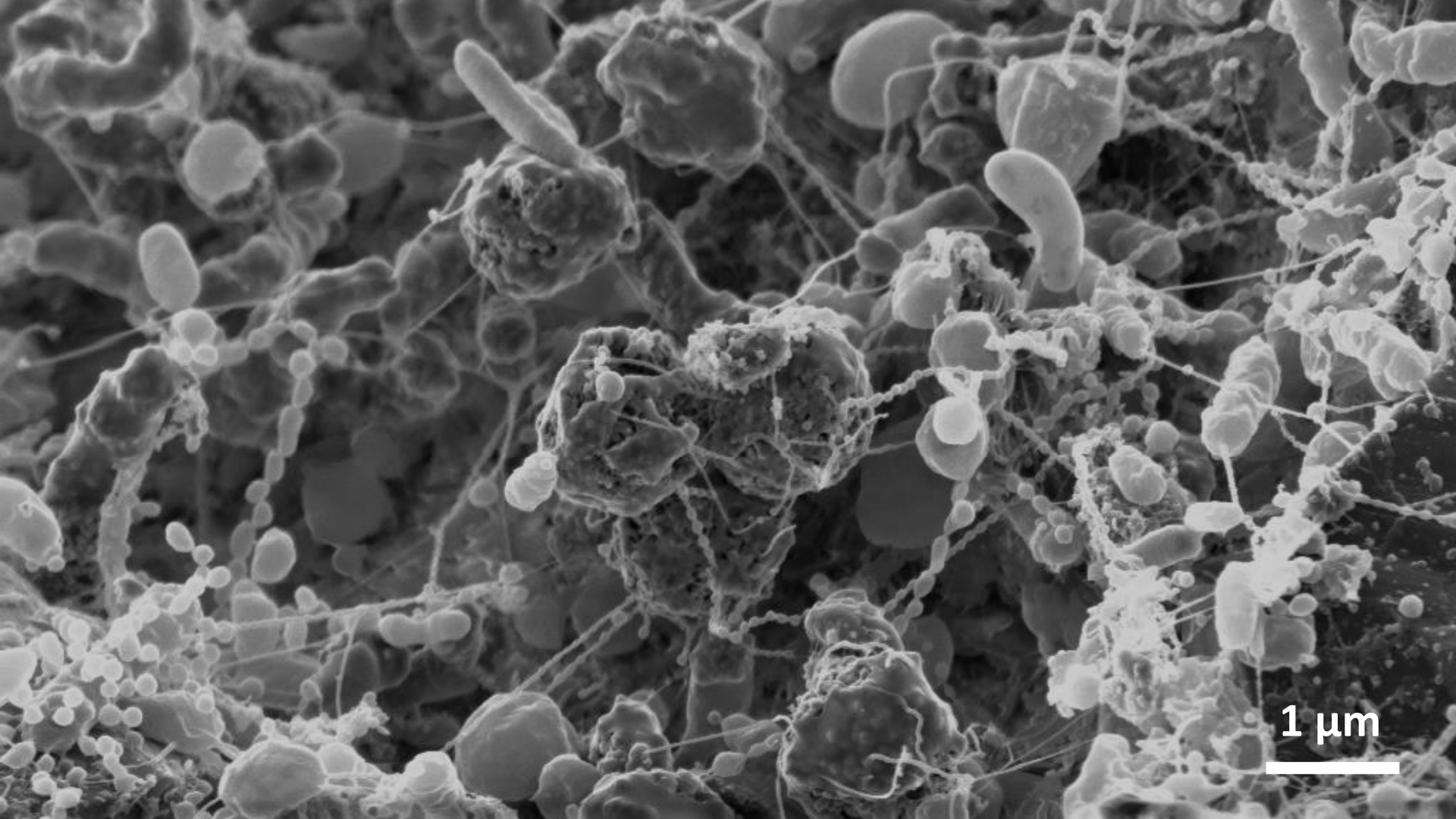


***Desulfovibrio desulfuricans* + Au(I) thiosulphate
(Lengke and Southam, 2007)**



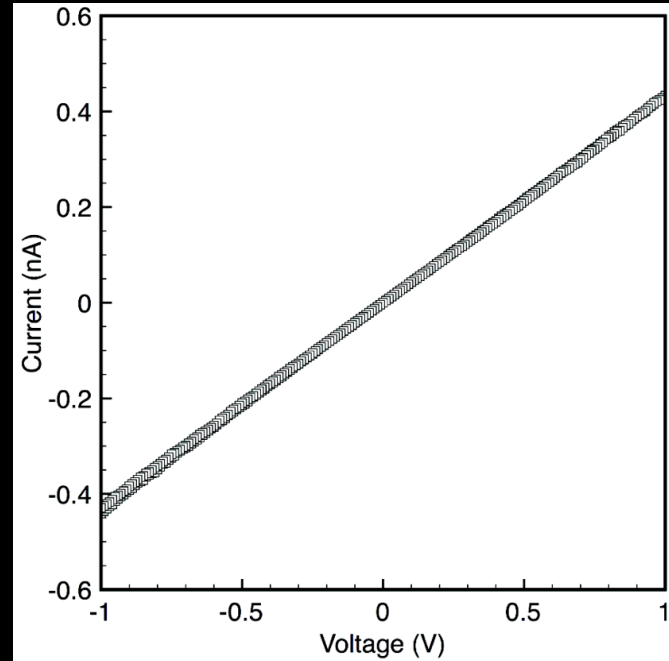
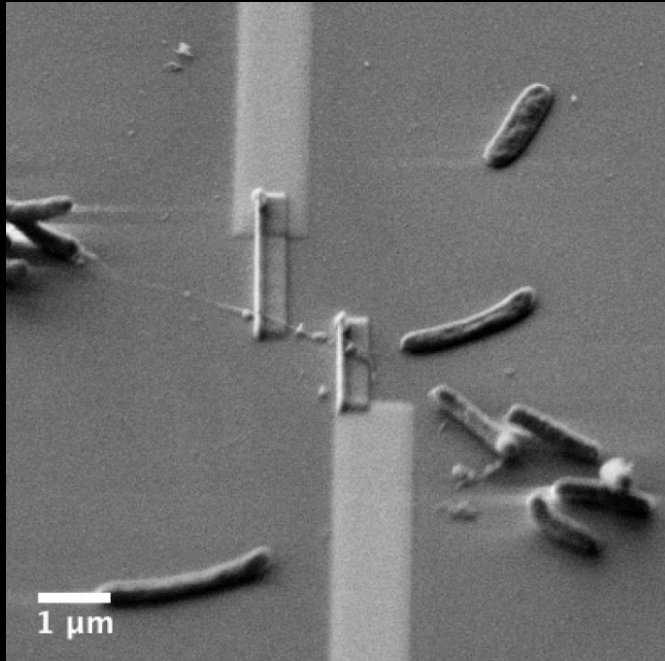


10 μm

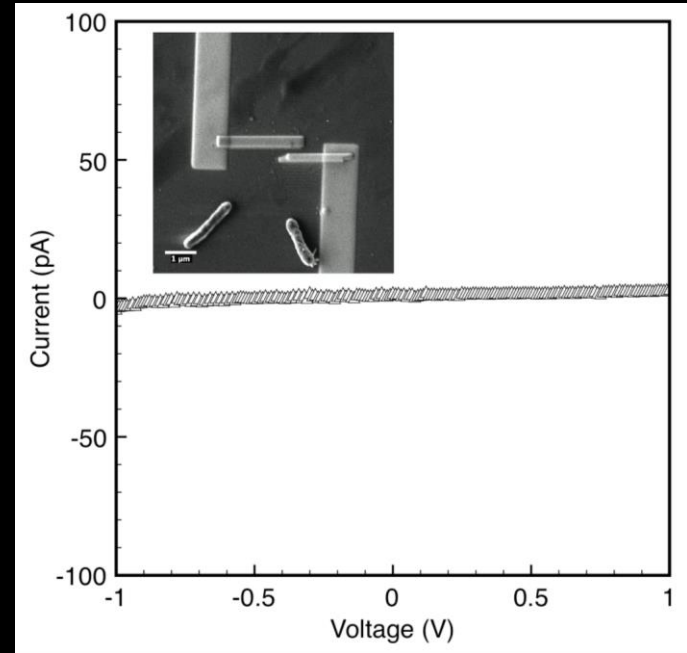
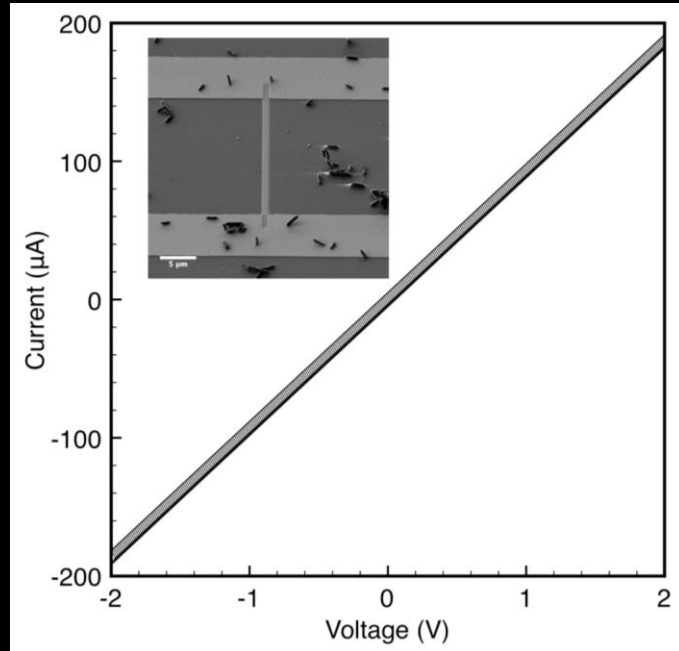


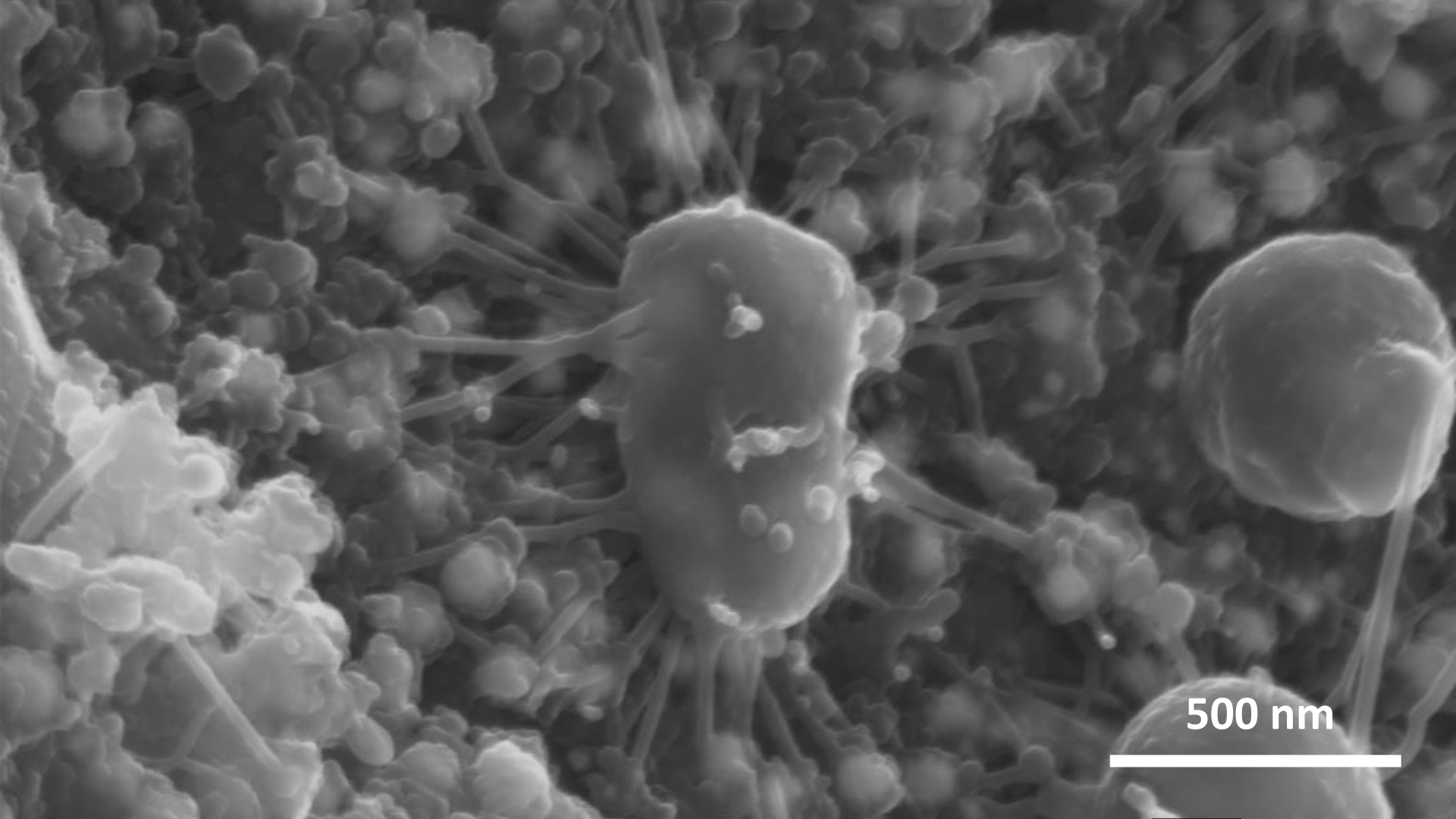
1 μm

Electrical transport along bacterial nanowires from *Shewanella oneidensis* MR-1 (El-Naggar et al., 2010)



Electrical transport along bacterial nanowires from *Shewanella oneidensis* MR-1 (El-Naggar et al., 2010)





500 nm

