Supplementary material for

Bacterial metal accumulation as a strategy for waste recycling management

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This file contains:

Supplementary Figures S1to S6

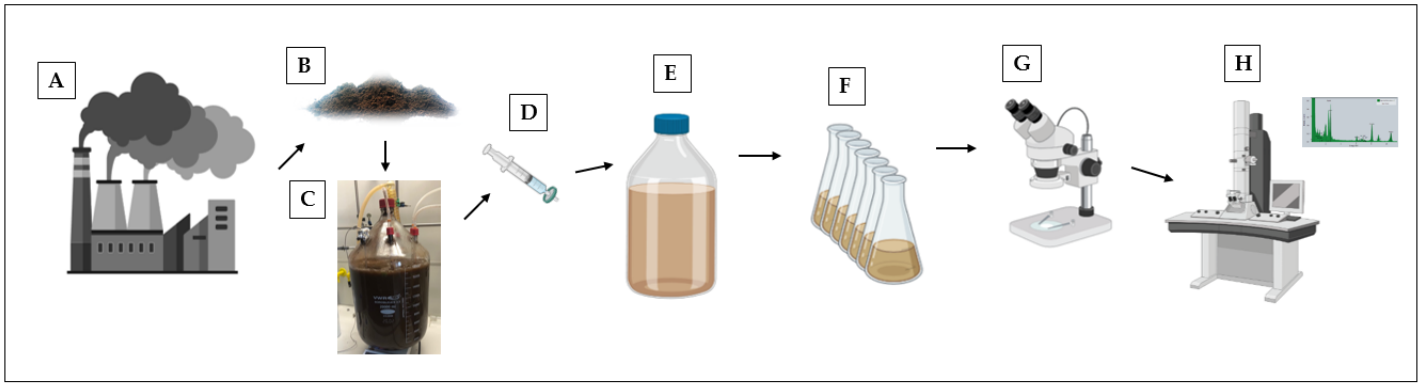

Figure S1: **Scheme of a cascade waste recycling approach.** Steelmaking processes **(A)** generate a variety of metal-containing waste products. BOF-dust **(B)** waste (metal composition table in [45]) is generated as a consequence of basic oxygen furnace (BOF) steelmaking processes.
BOF-dust was fed into a liquid *Acidianus manzaensis* culture **(C)** to test bioleaching abilities of this thermoacidophilic archaeon [45]. After cultivation, the bioleachate was filtered **(D)** to obtain bioleachate solution **(E)** for biosorption/bioaccumulation studies. Seven bacterial strains were cultivated **(F)** on native bioleachate solution (pH 1.70) and screened for cell growht or decay **(G).** Two strains, *Deinococcus aerius* and *Acidocella aluminiidurans* were analysed **(H)** for metal sorption/accumulation capacities via scanning transmission electron microscopy coupled to energy dispersive spectroscopy (STEM-EDS).

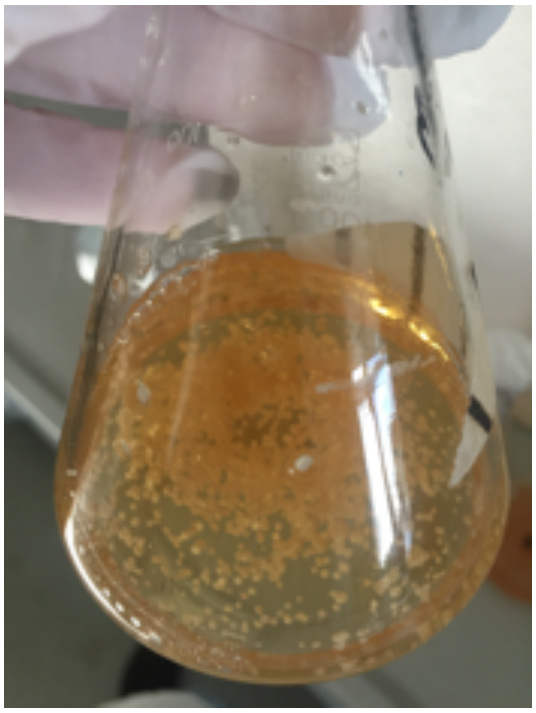

Figure S2: Precipitated pellets formed in the culture of *S. rimosus* upon contact with metal rich waste product material.

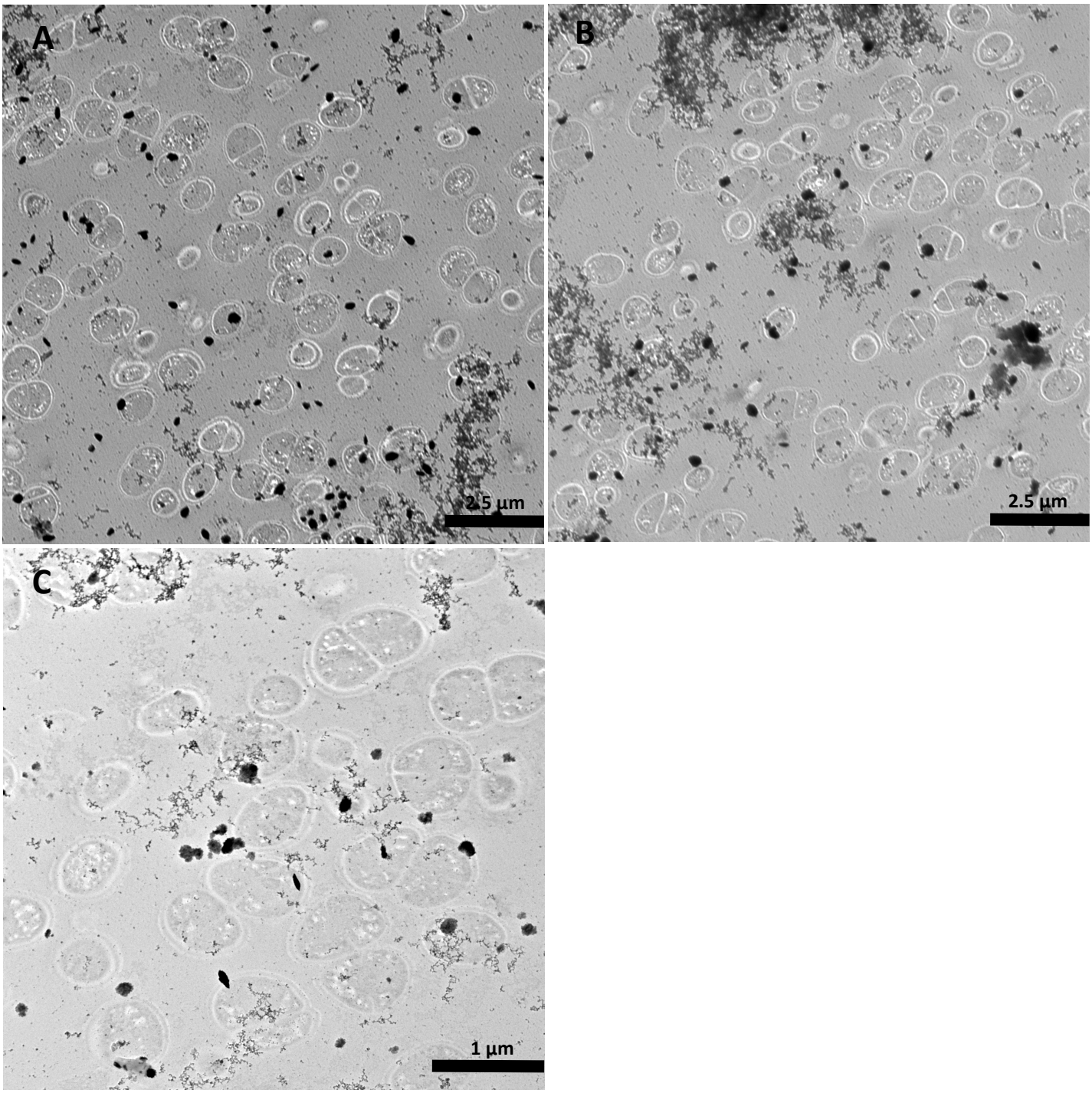

Figure S3: Additional TEM images of *D. aerius* cells after cultivation on acidic bioleachate solution. A, 10 min of cultivation; B, C, 24 h of cultivation.

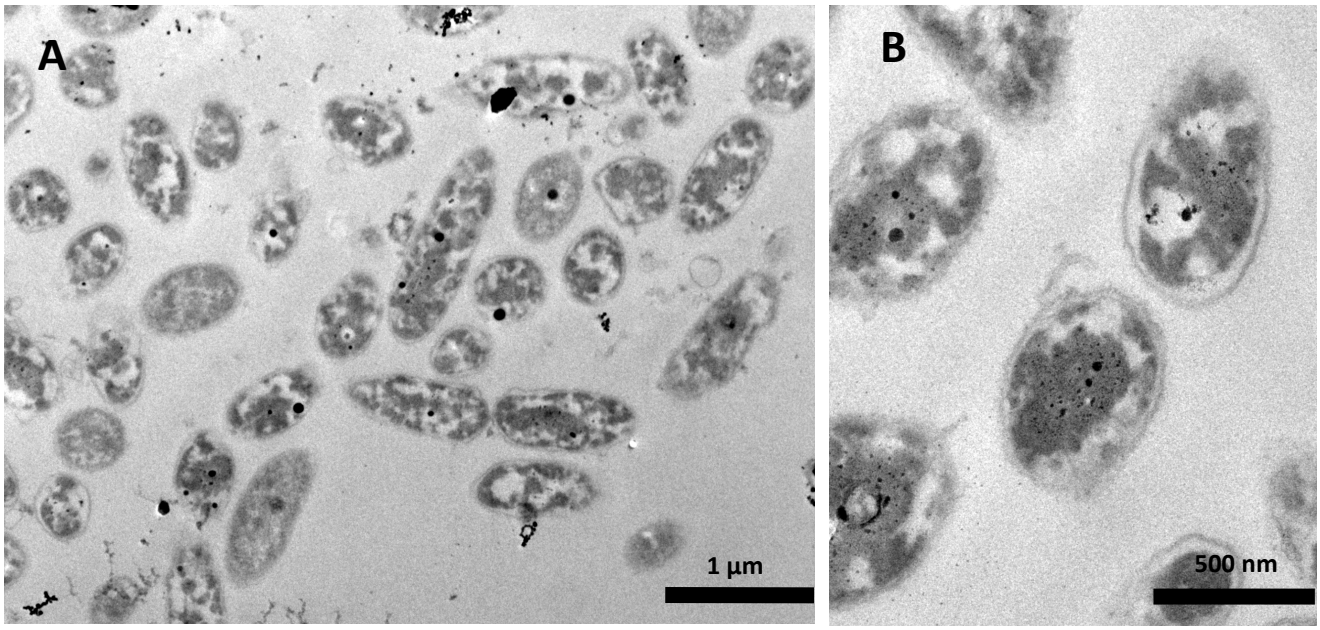

Figure S4: Additional TEM images of *A. aluminiidurans* cells after cultivation on acidic bioleachate solution. A, 10 min of cultivation; B, 24 h of cultivation.

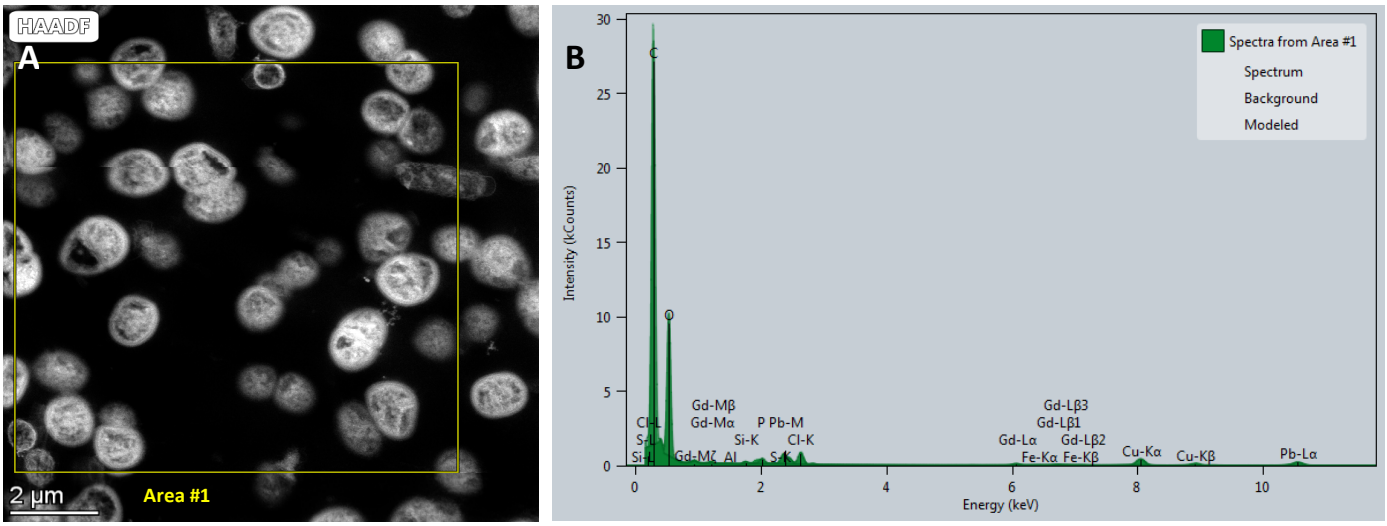

Figure S5: Additional elemental ultrastructural analysis of *D. aerius* cells cultivated on bioleachate for 24h. A, HAADF-STEM image of *D. aerius* cells; B, Energy- dispersive X-ray (EDS) spectra acquired from the depicted area in panel (A). Gadolinium (Gd) and Lead (Pb) peaks in EDS spectra are due to the sample staining procedure for TEM.

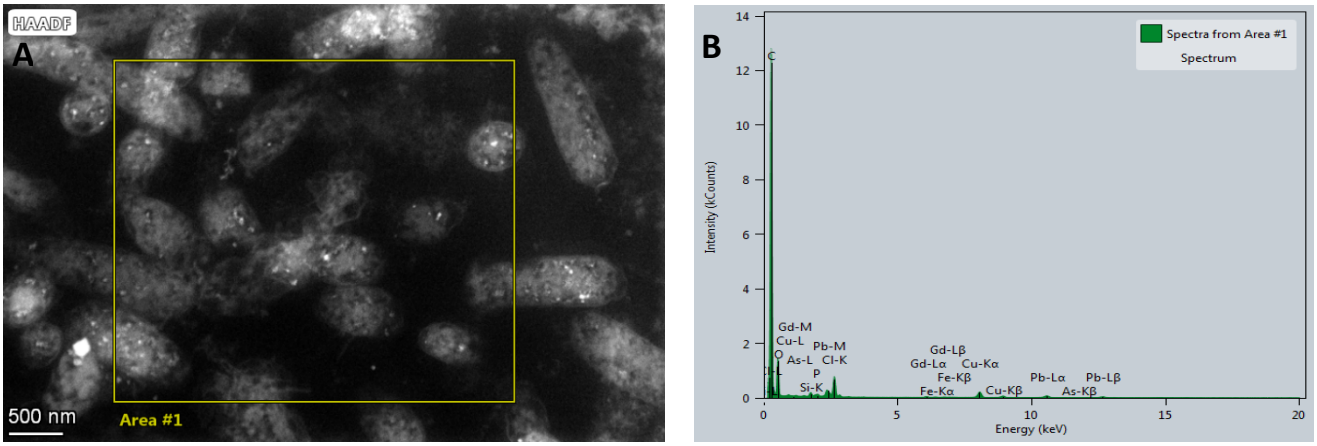

Figure S6: Additional elemental ultrastructural analysis of *A. aluminiidurans* cells cultivated on bioleachate for 24h.

A, HAADF-STEM image of *A. aluminiidurans* cells; B, Energy- dispersive X-ray (EDS) spectra acquired from the depicted area in panel (A). Gadolinium (Gd) and Lead (Pb) peaks in EDS spectra are due to the sample staining procedure for TEM.