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Fungal biofilm on Cu-mineralized speleothem from the Kiruna magnetite mine, Sweden

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Vivid blue stalactites and flowstone were sampled from the ceiling and walls of a disused tunnel on the 775m level of the LKAB Kiruna magnetite mine, Norrbotten County, Lappland, Sweden. These speleothem deposits formed over the 40 years since the tunnel was opened and abandoned. The stalactites are several cm long, and the flowstone ca. 1cm thick.

Continuous flow of water supports a living fungal biofilm on the speleothem surface that is intimately associated with a variety of crystalline and amorphous Ca, Cu and Al sulfate and carbonate phases. Stalactite interiors are monomineralic, consisting of an unidentified Cu-Al sulfate phase.

Isolates from the biofilm have closest affinity to the psychrophilic *Pseudogymnoascus*, not previously known to be associated with biomineralization.

Our initial results suggest fungi are involved in cycling of Cu from mine drainage, a property worth further study and potential exploitation for bioremediation strategies.

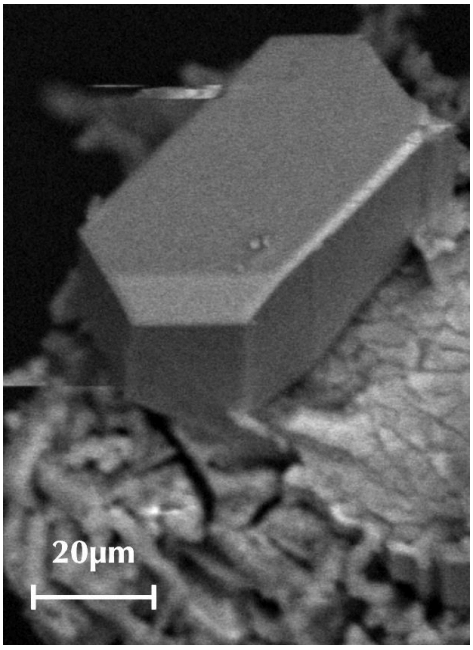

Figure 1: Crystalline Cu-bearing phase and fungal hyphae from speleothem surface