



## **Open questions on the significance, mechanisms and environmental implications of microbial biomineralization involved in metal and radionuclide sequestration**

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The formation of minerals by microbes (biomineralization) offers an efficient way to sequester metals and radionuclides within and/or at the surface of relatively stable solid phases. However, several questions remain unanswered including the following ones: first the diversity of biomineralization processes is yet likely unexplored. Second, the relative importance of these processes in the environment is not assessed. Finally, the role of microbial diversity on sequestration efficiency and the impact of biomineralization on the viability of microbes have not been yet studied. Here, I will address some of these questions based on diverse studies such as laboratory cultures of anaerobic Fe-oxidizing bacteria, field studies of an As-contaminated acid mine drainage located in the South of France (Carnoulès, Gard), field studies of an uranium-rich soil in France and laboratory cultures of phosphate-precipitating bacteria. This review, far from being exhaustive, will highlight some recent advances that we achieved in the understanding of microbial biomineralization and will raise some questions for the future. I will finally take advantage of this talk to show that tools capable to assess the speciation of organic molecules and metals at the submicrometer scale such as Scanning Transmission X-ray Microscopy (STXM) are now available and can be of major interest for the study of such geomicrobiological systems.