

ZeoBioFilms: Exploring Mineral-Microbe Interactions Using AFM and SEM

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Zeolites as Suitable Materials to Support Life

The interaction of zeolites and bacteria forming biofilms has been reported in soils (bio-fertilizer) [1]. Here, we present preliminary results on biofilm formation by extremophilic bacteria [2, 3] on well characterized surfaces of synthetic zeolitic materials [4] (ZeoBioFilms) using AFM and SEM*.

Results and discussion

BioSEM follows the steps of biofilm formation by extremophilic bacteria isolated from High Altitud Andean Lakes (HAAL): bacteria recognize, attach and grow to form a mature biofilm (Fig. 1B-C). In addition, AFM detects the surface modification after biofilm removal (Fig. 1A-D). We believe that a comprehensive understanding of the interaction mechanism can lead to biotechnological applications and shed light on evolution of life and astrobiology [5].

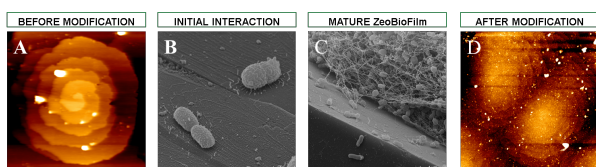


Figure 1. ZeoBioFilm evolution on the surface of the zeolitic material SAPO STA-7 and *Acinetobacter* Ver3 followed by AFM (coloured images) and SEM (b/w images).

*SEM assays performed in collaboration with Dr. Matthias Flötenmeyer, Max-Planck-Institut für Entwicklungsbiologie.

[1] Leggo *et al* (2006) *Science of the total Environment* **363**, 1-10. [2] Albarracin *et al* (2012) *Orig. Life Evol. Biosphe.* **42**, 201-221. [3] Belfiore *et al* *Extremophiles* DOI: 10.1007/s00792-013-0523-y. [4] Cubillas *et al* (2009) *Crystal Growth & Design* **9**, 4041-4050. [5] Farias *et al* (2013) *PLoS One.* **8** e53497.