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Chemical reactivity, transfer properties and modeling of Zn^{2+}, H^{+} sorption onto *Pseudomonas putida* biofilms in batch and column systems.

B. Causse (1,2), L. Spadini (1), C. Delolme (2), V. Guiné (3), M. Muris (2), Y. Curtet (1), A. Heyraud (4), J. Gury (5), J.M.F. Martins (3).

(1) LGIT, Environmental Geochemistry Group, University of Grenoble 1 and CNRS, BP 53, 38041 Grenoble Cedex 9, FRANCE

(2) L.S.E. (Environnemental Sciences Laboratory), E.N.T.P.E., Rue Maurice Audin, 69518, Vaulx-en-Velin Cedex, FRANCE

(3) LTHE (Laboratoire d'Etude des Transferts en Hydrologie et Environnement), University Grenoble 1 and CNRS, BP53, 38041 Grenoble Cedex 9, FRANCE

(4) CERMAV, CNRS, Grenoble

(5) LECA (Laboratoire d'Ecologie Alpine), CNRS UMR 5553, University Grenoble 1 and CNRS, BP53, 38041 Grenoble Cedex 9, France.

(benjamin.causse@obs.ujf-grenoble.fr / Fax: 0033 476 828 101/ Phone: 0033 476 828 016)

Pseudomonas putida biofilms were grown on a sandy laboratory column under recirculation conditions. In batch experiments, the reactivity toward Zn^{2+} and H^{+} of the biofilm grown in the porous matrix was compared to that of free living cells. The results show that biofilms are more reactive toward zinc and protons than free living cells. In particular the concentration of neutral pK sites are excessively high in biofilms. This suggests that in these two substrates the reactive sites differ in composition. In more detail this questions the nature of the functional groups involved in heavy metal binding. The major components of biofilms are exopolysaccharides (EPS), proteins and extra cellular nucleic acids. EPS and proteins contain essentially carboxylic groups, whereas nucleic acids contain essentially phosphodiester groups. In this on going project we compared the reactivity of the biofilm to that of a well characterized Xanthane exopolysaccharide. We found that the biofilm reactivity is even higher than

that of Xanthane biopolymer. This suggests that other compounds, presumably nucleic acids, contribute strongly to metal fixation in biofilms.

A PHREEQC reactive transfer model will be presented wich combines these findings and Zn^{2+} transfer experiments on sandy columns colonized by *Pseudomonas putida*.