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The role of biofilms on the alteration kinetics of waste matrixes

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The influence of an ubiquitous *Pseudomonas aeruginosa* on aqueous corrosion of municipal solide waste incinerator bottom ash, vitrified bottom ash and SON68 glass was studied during bacterial growth in static conditions at 25°C. Our objective was to study the role of biofilms on the alteration kinetics of these materials. Experiments were carried out for 19 weeks using a modified soxhlet's device, in a closed unstirred system with weekly renewal of the aqueous phase. The same experiments were conducted in sterile conditions. We elaborated a defined culture medium(*) allowing the growth of bacteria and a precise measurement of the solubilized elements.

Scanning electron microscopy and confocal laser microscopy revealed the formation of a biofilm (poly-anionic polymer) during biotic experiments, the composition of the biofilm clearly indicate that the biofilm is able to efficiently trap the constituents of the glass and/or to form a protective barrier at the solid/solution interface.

The concentrations of strontium and calcium measured in solution indicate that the rate of cation leaching was slower in the biotic medium compared to the sterile medium. Experimental data clearly indicated that the total mass of elements released from waste matrixes was between 40 and 50 % lower in biotic compared to sterile conditions.

(*) Aouad G., Geoffroy V., Meyer J.M., Crovisier J.L., Damidot D. and Stille P. (2005) Definition of a growth medium to study the alteration of silicates in the presence of

Pseudomonas aeruginosa. *C. R. Geoscience* **337**(15), 1340-1347