Kaolinite as a sorbent for As natural contamination

B. CAMPREDON, C. HUREL AND N. MARMIER

LRSAE – Sci. Fac., University of Nice Sophia Antipolis, Parc Valrose, 28 avenue Valrose, 06108 Nice cedex 2 France

The geological formation of the Mercantour basin is made of metamorphic rocks, granite, Permian argillite and sedimentary rocks, which can provide high arsenic concentrations in the riverine waters. In the Var (South of France) watershead high arsenic input were measured, and were attributed to the dissolution of the metamorphic rocks form the old massifs of Mercantour. This natural contamination may affect the geological environments, since the sediments are the main sinks of pollutants. When the environmental conditions are changed (hydrologic conditions, flow variation, pH, redox potential, etc.) the sediments can act as a source of contamination. In this study, kaolinite (a clayey material) was chosen as a potential binding agent for trapping the local excess of As. This adsorbent material was chosen on the basis of his natural occurrence in the studied watershead ecosystem.

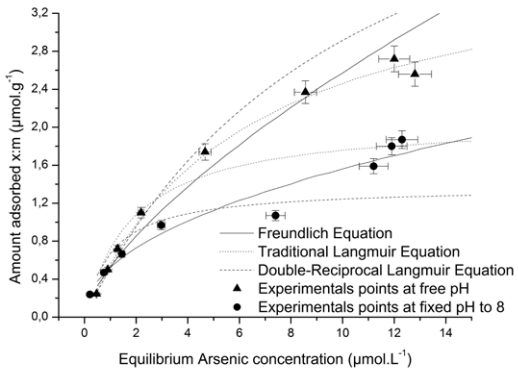

Figure 1: As adsorption on Kaolinite in $NaNO_3$ 0.1M and 13.3μM initial As concentration.

Adsorption of As on kaolinite was studied in various electrolytic conditions (concentration and composition), various solid to liquid ratios and various pH conditions (figure 1). The results were modeled considering empirical models and mechanistic models (surface complexation).

Changes in organic aerosol composition with aging inferred from aerosol mass spectra

M.R. CANAGARATNA[1,*], N.L. NG[1], J.L. JIMENEZ[2], P.S. CHHABRA[3], J.H. SEINFELD[3] AND D.R. WORSNOP[1]

[1]Aerodyne Research, Inc, Billerica, MA, USA (*correspondence: mrcana@aerodyne.com, ng@aerodyne.com, worsnop@aerodyne.com)

[2]CIRES & Department of Chemistry and Biochemistry, University of Colorado, Boulder, CO, USA (jose.jimenez@colorado.edu)

[3]Department of Chemical Engineering, California, Institute of Technology, Pasadena, CA, USA, (puneet@caltech.edu, seinfeld@caltech.edu)

The Aerosol Mass Spectrometer (AMS) provides real-time quantitative mass concentrations of non-refractory species in ambient aerosols. Factor analysis of ambient AMS organic aerosols (OA) spectra has been used to characterize the evolution of OA composition due to photochemical processing. A large database of ambient OA components has been analyzed with the "triangle" plot [1], in which f_{44}, ratio of m/z 44 (mostly CO_2^+ from acid-derived groups) to total signal in the component mass spectrum, is plotted against f_{43} (mostly $C_2H_3O^+$ from non-acid oxygenates). Examination of ambient oxidized organic aerosol (OOA) components in the triangle plot indicates that the relative acid group content and similarity of OA components increase with aging. A new parameterization of the H:C of OA components in term of f_{43} allows for further transformation of this data into the Van Krevelen diagram (H:C vs. O:C) [2]. Ambient OOA components also map out a triangular space in Van Krevelen diagram, showing a range of H:C at lower oxidization which decreases with increasing oxidation. The average slope (ΔH:C/ ΔO:C) that describes the transformation between the less and more aged OOA components is ~-0.5. This slope is consistent with the additions of both acid *and* alcohol functional groups without fragmentation, and/or the addition of acid groups with C-C bond breakage. The importance of acid formation in OOA evolution is consistent with increasing f_{44} in the triangle plot with photochemical age. The simple triangle and Van Krevelen plots for laboratory SOA formed in chamber experiments are also investigated.

[1] Ng, N. L., *et al*. (2010) *Atmos. Chem. Phys*., **10**, 4625-4641. [2] Heald, C. L., *et al*. (2010), *Geophys. Res. Lett*., **37**, L08803.