Geophysical Research Abstracts, Vol. 9, 08028, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-08028

Mechanisms formation of mineral-organic compounds in soils

D.L. Pinsky, G.N. Kurochkina

Institute of Physico-Chemical and Biological Problems in Soil Science, Pushchino, Russia
(E-mail: pinsky@issp.serpukhov.su, Fax: 007(4967)330595? Phone: 007(4967)730460)

The character of the adsorbent surface plays an extremely important role in adsorption of organic macromolecules and in formation of organic films at the surface of aluminosilicates. We believe that the specific adsorption of polyelectrolytes on heteropolar adsorbents and formation of adsorption layers occurs according to the mechanism proposed by Silberberg, which postulates that the process of specific adsorption consists of individual stages. The first stage corresponds to an orientation of macromolecules or hypo molecular structures for which their polar groups are predominantly attached to active areas of the adsorbent surface by electrostatic forces. Then, a slower process of activated chemisorption occurs. For natural aluminosilicates, chemisorption predominantly occurs at positively charged areas of the surface, which may be accompanied by a partial hydrophobization of the surface due to the orientation of the hydrophobic fragments of the organic molecules in the direction of the external solution. After formation of the first adsorption layer, the next adsorption layer is attached by van der Waals (weaker) forces. This process is accompanied by the orientation of the polar groups of the organic molecules in the direction of the external solution, and, as a consequence, the surface again becomes hydrophilic. The formation of strong mineral-organic surface compounds at chemisorption-favorable areas of the surface, whose properties differ from those of the initial aluminosilicate, are indicative of a cluster character of the surface of natural aluminosilicates.