

Model Investigation of Interaction of some Benzene Derivatives with Metals Related to Soils and Sediments

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It is considered (1) that processes of alteration and dissolution of minerals of soils and sediments are a consequence of surface reactions occurring, beside the others (such as H⁺ action), between OH-groups on the surface of hydrous oxides and dissolved organic ligands through coordination and surface complexes formation. Investigation with natural occurring materials (2-4) revealed that in dissolution of metals through complexation the most important role have the compounds with carboxy and hydroxy functional groups. These compounds, being mostly benzene derivatives, are either degradation products of humic material or are found as free molecule in soils and sediments (5-7). These facts initiated us to investigate the chromatographic behaviour of some benzene derivatives on various supports, such as: silica gel (8), alumina and silica gel impregnated with Fe(III) (9), Ca and Mg ions to simulate natural conditions. Organic model compounds were benzene derivatives with carboxy, hydroxy and methoxy groups. Thin layer chromatography was performed using tap and distilled waters as developers.

The following results were found:

- benzene carboxylic and phenolic acids exhibit small mobility on plain plates of silica gel and alumina and also on plates impregnated with Ca and Mg ions. This can be attributed to low solubility of the compounds in water. On the same supports the mobility of the compounds having two hydroxy or an aldehyde group is greater.
- on Fe(III) impregnated plates the mobility of the compounds examined is greater or lesser than on plain plates depending on the properties of the complexes formed with iron oxy/hydroxide. In addition, it is dependent on the way of how the plates are prepared; by prolongation of drying the plates, the mobility of the compounds is increased. This can be explained by decreasing the amount of hydroxy groups and water on the support and thus by different complexes formed.

The chromatographic data obtained can give us some information about the behaviour of the complexes formed as well as about the possible activity of the compounds tested against metal oxides in soils.

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