

A Spectromicroscopic Study of 3d Transition Metal Interactions with Humic Acid; A bright future for Humic Acid Research? (S02-nachtegaal174813-Oral)

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Abstract:

It is important to understand the interactions between environmentally important 3d transition metals and functional groups of soil organic matter, since these functional groups are very significant in determining the fate of these metals in the environment. We will present research showing the unique capabilities of soft x-ray microscopy, combined with Carbon Near Edge X-Ray Absorption Fine Structure (NEXAFS) spectroscopy at beamline X1A of the National Synchrotron Light Source (NSLS) (Upton NY), to study the interactions of 3d transition metals with functional groups of humic acid. Soft X-ray microscopy was applied to map the distribution of carbon containing functional groups of humic acid in solution. Interactions of first row transition metals and carbon containing functional groups of humic acid at pH 6.0 and I= 0.1 M NaNO₃ were then studied in situ with carbon NEXAFS spectroscopy. Shifts in intensity and position of the carboxylic and phenolic pi transitions upon metal reaction could be related to the number of 3d electrons, and thus provides information on the affinity of the carboxylic and phenolic functional groups for the 3d transition metals.

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