

Magnetic Characterization of Iron in Sediments of Urban Supply Lakes

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Oxyhydroxides of iron are the commonest mineral phases present in soils and sediments. The identification and quantification of the Fe-rich phases are an important application of geochemical environmental studies and is usually done by X-ray diffraction techniques. The presence of transition metals that could be incorporated into Fe-minerals structure, cause distortions in the unit-cell dimensions. The Mössbauer Spectroscopy is another specially suited technique to this study. Goethite (αFeOOH) is common in nature as a weathering product of iron minerals, particularly in soils and sediments. Investigations concerning the influence of crystallinity and Al^{3+} substitution for Fe^{3+} in the Mössbauer spectra of goethites have been carried out on synthetic samples in order to establish a reference against which natural samples might be compared. The influence of foreign metals other than Al associated with goethite is not well understood, but there are some indications that they could also reduce the magnetic hyperfine field. Another suitable technique used to examine the differences between the magnetic properties of these samples, rich in foreign metals, is the magnetic susceptibility. In this work, the use of these techniques, in addition to analytical procedures to identify substitutional impurities, allow verifying if these elements are in biodisponibility and which parameters could be used to control them.