

Humic and hymatomelanic acids interaction with lanthanide ions.

Autorzy

Maria Jerzykiewicz

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Streszczenie

The interactions of lanthanide ions, REE(III), with semiquinone radicals naturally occurring in humic (HA) and hymatomelanic (HY) acids of different origin were studied mainly by EPR spectroscopy. Quantitative EPR analysis proved that only the semiquinone free radical concentration in both, HA and HY, was affected by interaction with some of the lanthanide ions, whereas the EPR g parameters of the formed radical-REE(III) complexes remained unchanged. The radical concentration was practically unaffected by the REE(III) ions with 4f(1)-4f(6) electron configurations and in some degree increased by REE(III) ions with 4f(8)-4f(14) configuration. The lanthanide playing an exceptional role was Gd(III) (4f(7)), which diminished strongly the free radicals concentration. The quenching ability of Gd(III) was stronger towards the radicals provided by HA than by HY, what was assigned to higher content in HA of both, oxygen-containing functional groups and conjugated aromatic rings, leading to more efficient Gd(III)-radical interaction. The semiquinone free radicals of HA and HY originated from the compost were more reactive than those from peat, as the humic acids from mature compost with less bulk density have more accessible functional groups.

Słowa kluczowe

humic substances, Semiquinone radicals, lanthanide(III) ions, EPR spectroscopy

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