

Infrared and SEM-EDS Studies of the Peat TDF Interactions with Barium(II) Ion.

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Abstract

FTIR and SEM-EDS techniques was employed to characterize the interactions of peat with the Ba(II) ion. The displacement at ν -COO⁻ and ν -CO bands show that the major interaction is with catechol group. The presence of Ba was detected by SEM-EDS.

Introduction

Peat is an organic material that is formed in wetlands in acidic conditions of swamps and mangroves. It is a chemically complex material, consisting of four main groups: bitumen (fatty acids, waxes, and steroids), humic substances (humic acid, fulvic acids and humin), carbohydrates, lignins, polyphenolic substances, inorganic oxides and silicates. In this study the interactions of the ions Ba(II) with peat were characterized by the infrared spectroscopy and energy dispersive x-ray spectroscopy (EDS).^{1,2}

Results and Discussion

The Infrared spectra of peat (TDF) in the absence and presence of barium (II) are shown in Figure 1.

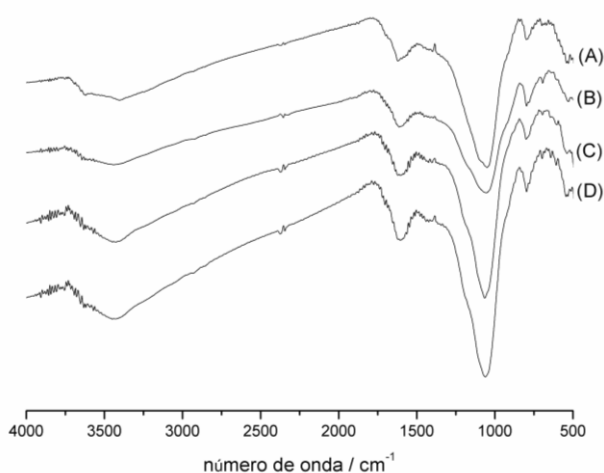


Figure 1. FTIR spectra of peat (TDS) in absence (A), and presence of Ba(II) at pH values: 5 (B), 7 (C) and 9 (D).

The most consistent features of these spectra are: a wide band around 3400 cm⁻¹ due to ν -OH of the various groups present in peat as phenols and alcohols; two weak bands at 2920 cm⁻¹ and 2850 cm⁻¹ due to ν -C-H; 1670 cm⁻¹ due to ν -COO⁻ and

the peaks at 1086 cm⁻¹ due to the ν -Si-O and ν -CO.^{3,4} The displacement at ν -COO⁻ and ν -CO bands are due to interaction of these groups by Ba(II) ion.

The EDS spectrum of peat in presence of Ba(II) at pH 7 is shown in Figure 2. The distribution of the interactions is a function of pH,⁵ and the displacement of ν -COO⁻ and ν -CO bands show that the predominant interaction of Ba (II) above pH 5 occurs with the catechol group present in the peat.

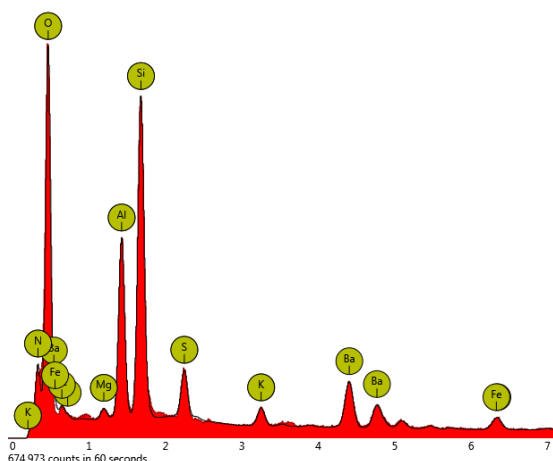


Figure 2. EDS spectrum of peat in presence of Ba(II) at pH 7.

Conclusion

FTIR and SEM-EDS shown to be efficient in the characterization of peat interactions with ion Ba (II). The amount of the Ba(II) interacting was measured.

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