

锰离子与胡敏酸络合反应特征研究

Characteristics of complex reaction between humic acid and Mn^{2+} ion

中文关键词: [胡敏酸](#) [Mn²⁺离子](#) [络合反应](#) [稳定性](#) [热力学特征参数](#)

Key words: [Humic acid](#) [Mn²⁺ ion](#) [Coordination reaction](#) [Stability](#) [Thermodynamic](#)

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作者	单位	E-mail
王强	西南大学资源环境学院	wqiang0496@yahoo.com.cn
魏世勇	西南大学资源环境学院	

中文摘要:

采用离子交换平衡法研究了在不同酸度、离子强度、温度条件下胡敏酸(HA)与 Mn^{2+} 络合反应稳定性和热力学特征。结果表明,在相同离子强度、反应温度条件下,随着pH的升高,HA与 Mn^{2+} 络合反应稳定常数增大;络合反应配位数在pH3.0~5.0范围内随着pH的升高而增加,在5.0~7.0范围内随着pH的升高而降低;离子强度增加,HA与 Mn^{2+} 络合反应表观稳定常数增加,离子强度从0.00到0.10 mol L⁻¹,HA与 Mn^{2+} 络合反应配位数增加,但离子强度从0.10 mol L⁻¹继续上升至0.15 mol L⁻¹,配位数呈现下降的趋势;胡敏酸络合 Mn^{2+} 标准自由能变 ΔG_m^θ 、焓变 ΔH_m^θ 、熵变 ΔS_m^θ 在298.2、308.2 K温度下均为负值,反应是自发进行的放热反应,较低的温度有利于反应的进行。

英文摘要:

Humic acid (HA) was extracted from surface soil under evergreen broadleaf forest in Jingyun Mountains of China. Effects of acidity, ion strength and temperature on stability and thermodynamics of the complex reaction between the humic acid and Mn^{2+} ion were studied using the ion-exchange equilibrium method. Results showed that its stability constant increased with increasing pH when ion strength and temperature remained unchanged, and with increasing ion strength, as well. Ligancy of the complex reaction increased with pH rising from 3.0 to 5.0, but decreased with pH rising further up from 5.0 and 7.0, and increased as well with ion strength rising from 0.00 to 0.10 mol L⁻¹, but decreased, too, with ion strength rising further from 0.10 to 0.15 mol L⁻¹. The thermodynamic parameters of the complex reaction, including standard free energy change ΔG_m^θ , standard enthalpy change ΔH_m^θ , and entropy change ΔS_m^θ , were all negative when the temperature fell within the range from 298.2 to 308.2K, suggesting that the complex reaction is a kind of exothermic one processing spontaneously and keeping it lower in temperature favors process of the reaction.

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