

论文

东北草甸棕壤对重金属铅的吸附行为研究

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摘要:

研究了重金属铅(Pb²⁺)在东北草甸棕壤上的吸附行为,探讨了吸附机理.结果表明,重金属铅(Pb²⁺)在东北草甸棕壤上的吸附动力学符合准二级吸附速率方程,吸附等温线为Langmuir型;随pH增大,吸附量在pH=2~4范围内急剧增大,而在pH=4~6范围内基本不变;惰性电解质(NaNO₃)的存在可明显抑制Pb²⁺的吸附,随NaNO₃浓度的增大,吸附量先急剧下降,后趋于平缓. Pb²⁺在草甸棕壤颗粒上的吸附机理包括离子交换吸附和表面功能基团键合作用吸附,其中表面功能基团键合作用吸附又可分为化学键合吸附和静电键合吸附,前者形成内络合层,后者形成外络合层.

关键词: 黏土 吸附 重金属 铅 草甸土壤

Sorption of lead on meadow brown soil in the northeast of China

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Abstract:

Sorption of pb²⁺) on meadow brown soil in northeast of China were studied, and the sorption mechanism was discussed. The results reveal that the sorption kinetic and the sorption isotherm of Pb²⁺) on the soil sample can be described by the pseudo-second order kinetic and Langmuir isotherm. With pH increasing, the sorption amount (qe) decreases rapidly in the pH range of 2~4 and does not change on the whole in the pH range of 4~6. The presence of the inert electrolyte (NaNO₃) can obviously restrain the sorption of Pb²⁺) on the soil sample. The initial rapid decrease and subsequent gentle decrease of qe are observed with an increase of NaNO₃ concentration. The sorption mechanism of Pb²⁺) on the soil sample can be described as ion-exchange sorption and surface functional group binding sorption. Furthermore, surface functional group binding sorption can be divided into chemical binding sorption to form the inner-sphere surface complexes and electrostatic binding sorption to form the outer-sphere surface complexes.

Keywords: clay sorption heavy metal lead meadow brown soil

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