

王而力,王嗣淇,王道涵.沙土不同有机矿质复合体对磷的吸附特征影响[J].环境科学学报,2013,33(2):594-601

沙土不同有机矿质复合体对磷的吸附特征影响

Effect of different organo-mineral complexes on adsorption characteristic of phosphorus on sandy soil

关键词: [沙土](#) [有机矿质复合体](#) [磷](#) [吸附](#) [碳标化吸附分配系数](#) [碳标化饱和吸附量](#)

基金项目: [辽宁省教育厅科研项目\(No.20060391\)](#)

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摘要: 采用平衡吸附法研究了沙土不同有机矿质复合体对磷的吸附特征影响.结果表明,去除腐殖质后的沙土对磷的吸附能力大大降低,其饱和吸附量 Q_m 和吸附分配系数 K 分别只能达到原样的38.41%和7.42%,说明有机矿质复合体是影响磷在沙土上吸附特征的主要因素;钙键有机矿质复合体的碳标化饱和吸附量为 $388.35 \text{ mg} \cdot \text{kg}^{-1}$,相当于原样的1.51倍,在其所形成的有机矿质复合体中存在着孔隙填充方式的磷吸附;铁铝键有机矿质复合体在对磷吸附中发挥着重要作用,其碳标化饱和吸附量可达 $500.23 \text{ mg} \cdot \text{kg}^{-1}$,相当于原样的1.93倍,其吸附机制除孔隙填充方式外,还存在铁铝氧化物及水化氧化物对磷的配位吸附.因此,考查土壤对磷的吸附能力时不仅要考虑腐殖质的含量,更要考虑腐殖质的复合形态,它也是影响土壤对磷吸附特征的重要因素.以原样的磷饱和和吸附量为基准,钙键有机矿质复合体和铁铝键有机矿质复合体携带的吸附态磷可分别按原样的1.51和1.93倍进行估算.

Abstract: Effect of different organo-mineral complexes on adsorption characteristic of phosphorus on sandy soil was investigated by batch experiments of equilibrium adsorption. Results indicated that the sorption capacity on the sandy soil reduced dramatically after humus was removed. Normalized sorption capacity and partition coefficient only accounted for 38.41% and 7.42% of original sample, respectively, and organo-mineral complex was a main factor in phosphorus sorption on sandy soil. Normalized carbon sorption capacity of Ca-bound complex was $388.35 \text{ mg} \cdot \text{kg}^{-1}$, which was about 1.51 times the original sample. The sorption mechanism of phosphorus on Ca-bound complex was micro-hole function filling. In addition, Fe/Al-bound complex played an important role in phosphorus adsorption. Normalized carbon sorption capacity of Fe/Al-bound complex was $500.23 \text{ mg} \cdot \text{kg}^{-1}$, which was about 1.93 times the original sample. The sorption mechanism of phosphorus on Fe/Al-bound complex was Fe/Al oxide or hydration oxide coordination sorption apart from micro-hole function filling. The adsorption capacity was determined by not only organic matter content, but also existent state of organic matter which was an important factor in sorption characteristic of phosphorus on sandy soil. Treating original sample as a basic standard, adsorption capacity of phosphorus on Ca bound complex and Fe/Al bound complex were estimated in accordance with 1.51 and 1.93 times.

Key words: [sandy soil](#) [organo-mineral complex](#) [phosphorus](#) [sorption](#) [normalized partition coefficient](#) [normalized sorption capacity](#)

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