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北京地区壤土对柴油的吸附作用研究

Sorption of diesel oil on loams in Beijing area

关键词： 吸附实验 北京壤土 柴油 粘土

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摘要： 通过静态吸附实验,研究了北京地区壤土对柴油的吸附行为,考察了温度、溶液pH值、土壤有机质含量和粘土的矿物组成对柴油吸附的影响.结果表明,4种土样对柴油的吸附等温线均较好地符合Langmuir吸附模式,其吸附能力的大小顺序为:轻壤土>中壤土>砂壤土>重壤土;温度和溶液pH值的升高,不利于柴油的吸附,温度从10℃升高到30℃,柴油的饱和吸附量从833.3 μg·g^{-1}降低到263.2 μg·g^{-1},pH值从4升高到10,柴油在重壤土、轻壤土、中壤土和砂壤土中的吸附量分别从1012μg·g^{-1}、1800 μg·g^{-1}、1377μg·g^{-1}和1272μg·g^{-1}降低到114μg·g^{-1}、236μg·g^{-1}、163 μg·g^{-1}和150μg·g^{-1};柴油的吸附量随土壤有机质含量的升高而增大,且两者具有线性关系;柴油的吸附量与蒙脱石含量具有线性正相关关系,说明粘土中蒙脱石含量对吸附量的影响较大.

Abstract: Static experiments for sorption behaviour of diesel oil on loams in Beijing area were carried out to investigate the influence of temperature, pH, organic matter content and clay mineral components on sorption. The results indicated that the adsorption isotherms of diesel oil on four soils were well described by the Langmuir type, and the adsorption capacity of diesel oil on the four soils from high to low was: Light loam, Medium loam, Sand loam and Dense loam. The increase of temperature and pH was not favourable to adsorption. The maximum adsorbed quantity of diesel oil decreased from 833.3 μg·g^{-1} to 263.2 μg·g^{-1} with increasing temperature from 10 ℃ to 30 ℃. Increasing the pH from 4 to10 led to the decrease of the adsorbed quantity on Dense loam、Light loam、Medium loam and Sand loam from 1012、1800、1377μg·g^{-1} and 1272 μg·g^{-1} to 114 、236 、163 μg·g^{-1} and 150 μg·g^{-1}, respectively. There was a positive linear correlation between the adsorbed quantity and organic matter content. A positive linear correlation was observed between the adsorbed quantity and the montmorillonite content, which suggested that the montmorillonite content of clay components had a great effect on adsorption.

Key words: adsorption experiment loam diesel oil clay Beijing