污染控制技术原理与工艺

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腈氯纶吸附纤维对亚甲基蓝和铅离子的共吸附行为研究

Study on adsorption behavior of methylene blue and Pb^{2+} by AN-VDC copolymer absorbable fibers

关键词： 腈氯纶吸附纤维 物理吸附 离子交换 混合 共吸附

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摘要： 采用无机活性炭与丙烯腈-偏氯乙烯共聚体共混,以二甲基甲酰胺为溶剂纺制了腈氯纶吸附纤维,并用水合肼控制预交联过程,通过碱性水解制得羧酸钠型离子交换吸附纤维,着重考察了该纤维在染料亚甲基蓝和重金属Pb^{2+}混合共存条件下对2种物质的共吸附行为.结果表明,混合条件下,该纤维对亚甲基蓝和Pb^{2+}的吸附量可分别达到9.5mg·g^{-1}和487.8 mg·g^{-1};活性炭对亚甲基蓝的物理吸附与改性纤维对Pb^{2+}的离子交换过程同时发生,离子交换的发生对物理吸附的影响较大;Langmuir模式比Freundlich模式更适于描述Pb^{2+}的等温吸附过程;随着温度的升高,纤维的物理吸附能力增强,而对Pb^{2+}的离子交换性能变化不大;pH为中性条件时,纤维对Pb^{2+}和亚甲基蓝的吸附量均达到最大.

Abstract: The wet-spun absorbable AN-VDC copolymer fibers containing various contents of activated carbon were produced via coagulation stragety, whereas the ion exchange AN-VDC copolymer fibers were obtained with aq-hydrazine and hydrolysis in basic solution successively. The adsorption property of AN-VDC copolymer fibers towards methylene blue and Pb^{2+} were studied. It is shown that the maximum adsorption capacity of methylene blue and Pb^{2+} are 9.5mg·g^{-1} and 487.8mg·g^{-1} respectively. We initially think that the physical adsorption of actived carbon and ion exchange happened at the same time. It may be noticed that the chemical adsorption has great effect on physical adsorption. It has been found that Langmuir model is more fit to describe the adsorption kinetic behavior than Freundlich on Pb^{2+} on the obtained fibers. Also, Increasing the temperature may improve the fiber's physical adsorption ability. The fibers have good adsorption efficiency when pH=7.

Key words: AN-VDC copolymer fibers physical adsorption ion exchange mix adsorption