分离工程

胶原纤维固载Fe(III)对磷酸根的吸附特性

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摘要　　将Fe（Ⅲ）固载在胶原纤维上制备吸附材料，研究了该吸附材料对磷酸根的吸附性能。结果表明，当温度为303 K，溶液的初始浓度为62.0 mg P·L-1时，胶原纤维固载Fe（Ⅲ）(FeICF)对磷酸根的吸附容量为32.69 mg P·g-1。在pH为3.0～6.0范围内平衡吸附量较大，即当磷酸根在溶液中以H2PO-4的形式存在时有利于吸附。吸附等温线符合Langmuir方程，吸附容量随温度和Fe（Ⅲ）的固载量的增加而增加。FeICF对磷酸根的吸附动力学符合拟二级速度方程。溶液中存在的Cl-、NO-3、SO2-4及CO2-3对磷酸根的吸附没有影响，表明FeICF对磷酸根有较强的选择吸附能力。

关键词　　胶原纤维　Fe(III)　固载　磷酸根　吸附

分类号

Adsorption of phosphate by Fe（Ⅲ）　immobilized on collagen fiber

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Abstract

　A novel adsorbent for the removal of phosphate in aqueous solution was prepared by immobilizing Fe（Ⅲ）　onto collagen fiber (FeICF）.The characteristics of phosphate adsorption on FeICF was investigated.The equilibrium adsorption capacities of FeICF for phosphate was 32.69 mg P·g-1 at 303 K when the initial concentration of phosphate was equal to 62.0 mg P·L-1.Maximum phosphate adsorption was observed in the pH range of 3.0—6.0, which implied that the single charged species (H2PO-4) favored the adsorption of phosphate on FeICF.The adsorption isotherm of phosphate on FeICF could be described by the Langmuir equation, and the adsorption capacity increased with increasing temperature.The adsorption kinetics of phosphate on FeICF could be well-described by the pseudo-second-order rate model.The co-existing anions such as Cl-, NO-3, SO2-4 and CO2-3 in the solution had no effect on the adsorption of phosphate on FeICF.

Key words　collagen fiber　Fe（Ⅲ）　immobilization　phosphate　adsorption

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