

研究论文

## 以聚乙烯基咪唑为配基的内毒素亲和吸附剂的研究

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**摘要** 通过乙烯基咪唑(VI)在硅胶粒子表面的自由基接枝聚合制备了一种以聚乙烯基咪唑为配基的新型内毒素亲和吸附剂. 用FTIR检测样品中咪唑基的特征吸收, 用热重分析法(TGA)测定了PVI的接枝率. 实验发现, PVI在吸附剂中的含量对内毒素的吸附率影响很大. 当PVI的接枝率为2.5%左右时, 吸附剂对内毒素的去除率最大. 在离子强度小于1 mol/L和pH=7的中性条件下, PVI吸附剂对内毒素具有最佳的吸附性能. 该吸附剂具有良好的血液相容性. 内毒素在该亲和吸附剂上的吸附等温线符合Freundlich吸附方程, 其吸附动力学为二级反应.

**关键词** [内毒素](#) [亲和吸附](#) [乙烯基咪唑](#) [接枝聚合](#)

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## Studies on an Affinity Sorbent with Polyvinylimidazole as Ligand for Removing Endotoxin

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**Abstract** A novel composite affinity adsorption material bearing polyvinylimidazole(PVI) as the ligand for selective removal of endotoxin(ET) was prepared by graft polymerization of vinylimidazole onto silica gel particles in DMF(*N,N*-dimethyl-formamide). The characteristic bands of imidazole ring at 1500 cm<sup>-1</sup> and 665 cm<sup>-1</sup> were detected *via* FTIR and the grafting degree(GD) of PVI was measured with TGA according to the weight loss of the sample. The ET adsorption capacity of the sorbents shows dependence on GD of PVI on the sorbent, and the maximum ET adsorption capacity was attained with GD of 2.5%. The effects of ionic strength and pH values of the testing solution on the sorbent performance were also studied. At pH=7 and ionic strength lower than 1 mol/L the sorbent had the best adsorption ability toward ET even in presence of BSA. The sorbent shows a good blood compatibility. The adsorption kinetics and the isotherm of the sorbent were well accorded with the second order equation and Freundlich equation, respectively. The results reveal the applicability of PVI or other compounds with imidazole group to serve for good ligand in ET removal.

**Key words** [Endotoxin](#) [Affinity adsorption](#) [Vinylimidazole](#) [Graft copolymerization](#)

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