

分离工程

逆体积排阻层析法测定层析介质的孔径分布

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摘要

针对层析介质的孔径分析, 基于刚性球状分子进入柱状孔的假设, 分别采用高斯正态分布和对数正态分布描述孔径分布, 利用简化的单孔分配因子模型, 建立了孔径分布函数和分配因子 K_d 的关联, 通过体积排阻层析实验测定系列标准物的 K_d , 从而拟合得到孔径分布信息, 建立了逆体积排阻层析法。以葡聚糖作为分子大小的标准物, 测定了5种典型层析介质 (SP Sepharose FAST FLOW、Q Sepharose FAST FLOW、Toyopearl DEAE-650M、Streamline DEAE和Sephadex G-150) 的 K_d , 计算和比较了不同介质的孔径分布, 分析了介质的可吸附孔表面积等结构参数, 证实了逆体积排阻层析法分析层析介质孔径分布的可行性和实用性。

关键词

[逆体积排阻层析](#) [层析介质](#) [孔径分布](#) [分配因子](#)

分类号

Determination of pore size distribution of porous media by inverse size-exclusion chromatography

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Abstract

The method of inverse size-exclusion chromatography (ISEC) was established to determine the pore size distribution (PSD) of porous chromatographic media. Two well-known pore size distribution (PSD) models, Gaussian distribution and log-normal distribution, were investigated in the present work. The most used local partition coefficient model was adopted with the assumption of rigid spherical solutes in the cylindrical pores. Then the relationship between PSD and the theoretical distribution coefficient K_d was established. After the measurement of K_d with a series of molecule standards by size-exclusion chromatography, the information of PSD could be obtained with the correlation of calculated K_d to the experimental data. In the present work, K_d of five typical chromatographic media, SP Sepharose FAST FLOW, Q Sepharose FAST FLOW, Toyopearl DEAE-650M, Streamline DEAE and Sephadex G-150, were measured by using dextrans as the standards. Then the PSDs of five media tested were determined by the method of ISEC. The model calculation fitted well with the experimental data, and the PSDs of different media were analyzed. In addition, the accessible internal pore surface area was calculated and discussed. The results demonstrated that ISEC is a feasible method to determine the PSD of porous chromatographic media.

Key words

[inverse size-exclusion chromatography](#) [chromatographic media](#) [pore size distribution](#) [distribution coefficient](#)

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