

化学与环境

羧甲基-β-环糊精插层水滑石膜的制备及其对外消旋色氨酸选择性吸附的研究

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摘要:

采用原位生长技术制备了羧甲基-β-环糊精插层水滑石薄膜, 并采用XRD和红外光谱对其进行了结构表征。在XRD图中发现环糊精插层后, 水滑石的001峰向小角度移动, 表明水滑石层间距增大; 在红外光谱分析中发现, 插层产物在1596cm⁻¹处出现了羧基的特征红外吸收峰, 这均证实了环糊精插层进了水滑石层间。进一步研究了该水滑石膜在不同初始浓度下对外消旋色氨酸溶液的吸附情况, 发现吸附后的滤液旋光度为正, 表明该薄膜优先吸附L-色氨酸。得到了吸附等温线, 发现该吸附具有饱和性, 这是因为选择性吸附是由于水滑石层间环糊精对L-色氨酸的选择性包合产生的, 层间环糊精的量是确定的, 所以选择性吸附具有饱和性。

关键词: 水滑石 羧甲基-β-环糊精 色氨酸 插层 选择性吸附

Study of the preparation of a novel material by intercalating carboxymethyl-β-Cyclodextrins into layered double hydroxide and its chiral absorption to tryptophan

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Abstract:

A novel carboxymethyl-β-cyclodextrins (CMCD) intercalated layered double hydroxide film was prepared by in situ growth technology. The structure and chemical composition of the intercalated materials were studied by XRD and IR. The XRD analysis showed that the 001 peak of hydrotalcite moved to small angle after intercalation of CMCD, which indicated that the interlayer distance of LDH increased obviously. The asymmetric stretching band of —COO⁻ appeared at 1596cm⁻¹, which indicated that the CMCD intercalated into the LDH interlayer. Furthermore, the chiral adsorption behavior of the intercalated material to the tryptophan at series of concentration was studied primarily. The optical rotations of these filtrates were positive, which indicated that the films preferentially adsorbed the L tryptophan. The adsorption isotherm was obtained. It was found that the enantio selective adsorption had a maximum adsorption capacity, which was caused by the chiral reorganization of interlayer immobilized CMCD. The amount of the interplay CMCD was determinate, and the enantio selective adsorption was saturable.

Keywords: layered double hydroxide carboxymethyl-β-cyclodextrin(CMCD) tryptophan intercalation selective absorption

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