

淀粉/PEG制备双孔块状SiO<sub>2</sub>载体材料及其酶活力

杨洪斌<sup>1</sup>, 陈奇<sup>1</sup>, 宋鹍<sup>1</sup>, 叶蕊芳<sup>2</sup>, 候凤珍<sup>1</sup>, 陆剑英<sup>1</sup>

1. 华东理工大学无机材料系, 上海 200237; 2. 华东理工大学生物工程系, 上海 200237

收稿日期 2005-10-21 修回日期 2005-12-22 网络版发布日期 接受日期

**摘要** 采用溶胶-凝胶法, 以聚乙二醇为介孔造孔剂、淀粉为大孔造孔剂, 经过600℃热处理, 制得介孔平均孔径为10nm左右、大孔平均孔径为8~11μm的SiO<sub>2</sub>块状材料. 样品的最小密度为0.34g·cm<sup>-3</sup>, 最大气孔率为76%. 引入30%淀粉制备多孔样品作固定葡萄糖淀粉酶的载体, 可使初始酶活力由原来的5994U提高至14702U. 且连续使用五次之后仍具有一定的酶活力. 另外在80℃水中浸泡7天之后, 多孔样品对酶的吸附量均有提高. 浸泡前后, 酶活力相差不大. 这些结果表明: 此类多孔材料在固定葡萄糖淀粉酶方面可长时间使用, 便于酶的回收、保存和再利用.

**关键词** [双孔结构](#) [多孔块体](#) [溶胶-凝胶法](#) [酶载体](#)

**分类号** [TQ171](#), [O61](#)

## Synthesis and Enzyme Activity of SiO<sub>2</sub> Monolithic Carrier with Double-pore Structure by Addition of Starch/PEG

YANG Hong-Bin<sup>1</sup>, CHEN Qi<sup>1</sup>, SONG Li<sup>1</sup>, YE Rei-Fang<sup>2</sup>, HOU Feng-Zhen<sup>1</sup>, LU Jian-Ying<sup>1</sup>

1. Department of Inorganic Materials, East China University of Science and Technology, Shanghai 200237, China; 2. Department of Biochemistry Engineering, East China University of Science and Technology, Shanghai 200237, China)

**Abstract** SiO<sub>2</sub> monoliths with double-pore structure were successfully synthesized with polyethylene glycol as mesopore-making agent and starch as macropore-making agent via a sol-gel route. The porous blocks, having mesopores with about 10nm pore size and macropores with 8~11μm pore size, could be formed from the removal of polyethylene glycol and starch after heated at 600℃. The minimal density of the obtained samples was 0.34g·cm<sup>-3</sup> and the maximal porosity was 76%. The original enzyme activity was improved from 5994U to 14702U by adding 30% of starch to the bare SiO<sub>2</sub> sample. After immersed in water at 80℃ for 7 days, the enzyme adsorption of the samples was increased and there was little difference between enzyme activity before and after immersion. Those results indicated that such double-pore materials with long-term stability on gluczyme immobilization should be easy to reclamation, reservation and recycle of enzyme.

**Key words** [double-pore structure](#) [porous monolithic](#) [sol-gel](#) [enzyme carrier](#)

DOI:

通讯作者 陈奇 [qichen@ecust.edu.cn](mailto:qichen@ecust.edu.cn)

扩展功能

本文信息

▶ [Supporting info](#)

▶ [PDF\(492KB\)](#)

▶ [HTML全文\(0KB\)](#)

▶ [参考文献](#)

服务与反馈

▶ [把本文推荐给朋友](#)

▶ [加入我的书架](#)

▶ [加入引用管理器](#)

▶ [复制索引](#)

▶ [Email Alert](#)

▶ [文章反馈](#)

▶ [浏览反馈信息](#)

相关信息

▶ [本刊中 包含“双孔结构”的相关文章](#)

▶ 本文作者相关文章

- [杨洪斌](#)
- [陈奇](#)
- [宋鹍](#)
- [叶蕊芳](#)
- [候凤珍](#)
- [陆剑英](#)