

分子筛对葡萄糖淀粉酶的吸附性能研究

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摘要 测定了黑曲霉葡萄糖淀粉酶(E.C.3.2.1.3)在三种改性的、具有中孔和大孔的分子筛上的吸附等温线并将吸附量和吸附等温线的形状与分子筛的等电点、孔容、孔径及酸性相关联。讨论了孔结构和不同酶吸附量对分子筛固定化葡萄糖淀粉酶活性的影响。发现葡萄糖淀粉酶在再造孔分子筛上的单层饱和吸附量与再造孔的方法密切相关,三种不同再造孔方法制得的分子筛具有不同的骨架Si/Al比、不同的孔分布和比表面积。不同的Si/Al比导致不同的酸性质和等电点。酶吸附量与载体的表面酸性、等电点以及吸附时溶液的pH有关。分子筛对酶的吸附以静电作用为主。其次,当中孔孔径和孔容越大时,单层饱和吸附量亦越大。随着分子筛对葡萄糖淀粉酶的吸附量增加,固定化酶的活力增大,但固定化酶的比活力随吸附量的增加、中孔孔容和孔径的减小而下降。

关键词 [分子筛](#) [葡萄糖](#) [淀粉酶](#) [吸附](#) [固定化酶](#)

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Studies on the adsorption of glucoamylase on molecular sieves

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Abstract The adsorption isotherms of glucoamylase (E.C.3.2.1.3) on modified molecular sieves DY with mesopore and macropore were determined. The enzyme adsorption amount and the shapes of the isotherm were related to the properties such as point of zero charge (PZC), pore volume, pore diameter and acidity of the molecular sieves DY and the pH of the adsorbing solution. The relationship among acidity, pore structure of molecular sieves, adsorption amount of enzyme and activity of the enzyme adsorbed was also discussed. Th results show that the adsorption amount is closely related to the procedure that applied to modify the molecular sieve, which makes the molecular sieves DY with different Si/Al ratio, pore distribution and specific surface area. Thus, the different Si/Al ratio causes the molecular sieves DY to have different acidity properties and different PZC. It is found that the main drive force for glucoamylase adsorbing on molecular sieves is electrostatic interaction. The experimental results also show that for the molecular sieves DY the enzyme adsorption amount increases with the increase of the surface acidity, the pore diameter and pore volume, and the enzyme activity increases with the increase of enzyme adsorption amount while the specific acitivity decreases with the increase of enzyme adsorption amount and the decrease of mesopore diameter and volume of the molecular sieves DY.

Key words [MOLECULAR SIEVE](#) [GLUCOSE](#) [AMYLASE](#) [ADSORPTION](#) [FIXED ENZYME](#)

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