化学学报 2006 64 (12): 1284-1290 ISSN: 0567-7351 CN: 31-1320/06

研究论文

配液结晶法制备溶菌酶蛋白质晶体的生长机理研究

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收稿日期 2005-5-19 修回日期 2006-2-7 网络版发布日期 接受日期

摘要 采用配液结晶法制取了溶菌酶蛋白质晶体, 使用动态光散射测量了溶液中聚集体的颗粒度几率分布; 使用Zeiss显微镜测定了溶菌酶(110)晶面的生长速度. 实验表明: 随着蛋白质和NaCl浓度的增加, 溶液中聚集体的颗粒尺寸也相应增加. 随着反应时间的增加, 溶菌酶分子在溶液中的聚集反应, 逐渐达到平衡; 在蛋白质和NaCl浓度较高时, 溶菌酶晶体的(110)面生长较快, 而在蛋白质和NaCl浓度较低时, 该晶面生长较慢. 基于二维成核生长机理, 从晶体生长动力学理论方程出发, 计算了二维成核的形成能α＝4.01×10^{-8} J•cm^{-2}.

关键词 蛋白质晶体 晶体生长机制 动态光散射

分类号

Study on Growth Mechanism of Lysozyme Crystal Grown by Batch Crystallization Method

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Abstract The lysozyme crystals were grown by batch crystallization method. The distribution of the aggregates particles in the lysozyme solution was measured by dynamic light scattering (DLS). The growth rate of lysozyme crystal was obtained by Zeiss microscope. The experimental results showed that the dimension of aggregate particles was increased with the concentration of protein and NaCl in the solution. The aggregation reactions of lysozyme molecules in the solution were increased with time gradually and arrived at equilibrium finally. The finding indicated that the higher the concentration of protein and NaCl, the faster the growth rate of (110) face. According to kinetics of crystal growth, the formation energy of two-dimensional nucleation, α was calculated to be about 4.01×10^{-8} J•cm^{-2} based on two-dimensional nucleation mechanism.

Key words protein crystal crystal growth mechanism dynamic light scattering

DOI:

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