

Protein Crystal Growth in Planar and Integrated Gel Interface Diffusion Device

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A liquid-gel-liquid counter diffusion capillary system has successively used for macromolecular crystallization both on ground and in microgravity environment [1], [2]. This system however shows slow kinetics of crystal growth and non-uniform deposition of crystals in a capillary, which mainly arise from one directional (vertical) mass transport of precipitant reagent into protein solution. This is also not provided for the purpose of high-throughput crystallization/X-ray diffraction data collection experiments, due to the difficulty of handling of each glass capillary.

A novel type of gel counter diffusion device is developed for both purposes of conventional and high-throughput protein crystallization. Precipitant and protein cells are separated by thin gel layer(1-2mm in thickness), and are horizontally arranged in a planar well pate. Protein crystals grown in the protein cell in which dimensions of width/length are about 1mm/100mm, are easily observed by CCD camera and also accessed by loop device so as to mount them. To improve the non-uniform deposition of protein crystals during the counter diffusion process, inert liquid layer [3] is embedded beneath the protein solution cell. Without circulation of the inert liquid layer, protein crystals are distributed uniformly over the whole range of protein solution cell.

[1] Garcia-Ruiz J.M., et al., *J. Crystal Growth*, 2001, **232**, 165. [2] Maes D., et al., *Acta Cryst.*, 2004, **D60**, 463. [3] Adachi H., et al., *Jpn. J. Appl. Phys.*, 2002, **41**, L1025.

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