



Content:

- A. Colloidal crystallization under external fields:** Colloidal crystals are promising materials for optical circuits and optical computer in the future. We have successfully fabricated bulky grains ($\sim 6.1 \text{ mm}^3$) of a close-packed polystyrene colloidal crystal ((a)) by centrifugation. We have also succeeded in controlling nucleation of the crystals using an optical trapping method (b).
- B. In situ observation of molecular steps on protein crystal surfaces and novel crystallization techniques without any precipitants:** Fundamental studies and developments of novel techniques of protein crystallization are important for obtaining high quality crystals, which are prerequisites of genomic drug discovery. We are now studying kinetic behaviors of molecular steps on the surface of a glucose isomerase crystal ((a)). We have also succeeded in fabricating high quality lysozyme crystals without using any precipitants ((b)) for the first time.
- C. Precise growth mechanisms of protein crystals under microgravity:** Microgravity is known to be a good environment for obtaining high quality protein crystals. Now we are preparing for near future space experiments using parabolic flight opportunities ((a) and (b)).

Keywords: Crystal Growth, Protein, Colloid, Microgravity

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