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結晶成長の“その場”観察の発展と将来

Recent Development and the Future of *In Situ* Observation of Crystal Growth

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When we started *in situ* observation of crystal growth in space more than 20 years, most of the experiments were conducted *ex situ*, namely the materials such as protein crystals were synthesized in space, in what follows the crystals are transported to the ground to be investigated by varieties of methods. This might be good for the materials which have no bad influenced by the transportation, mechanically or chemically. However most of solution grown crystals and biomaterials are fragile and weak. That is the basic idea why we started to think of *in situ* works in space environments, thought the apparatus which possess the same sensitivity as on the ground laboratory, should have been as small as possible. At the same time, in those days, we needed to finish the experiments as quickly as possible because of the limited facilities such as drop shafts or aircrafts for microgravity. These limitations lead us to develop SMALL but very sensitive and FAST diagnostic apparatus.

For the study of crystal growth, we had just started to employ laser interferometry and phase-sensitive microscopy to study the mechanism of crystal growth in mainly liquids. We had a challenge to use these heavy and sensitive optics in microgravity facilities. Thanks to these developments, we have done many microgravity experiments by using *in situ* observation methods. In this talk, we will show some key results obtained so far, to follow the new *in situ* apparatus that can be employed in space as well.