

Crystallization in Space

Katsuo Tsukamoto[1]

[1] Graduate School of Science, Tohoku University

<http://www.ganko.tohoku.ac.jp/shigen/tsukamoto.html>

Based on our recent nucleation experiments in solution under microgravity during parabolic flight using an aircraft, nucleation rate of calcite crystals was found to be reduced by the order of four, which was better interpreted due to the suppression of heterogeneous nucleation under microgravity. Growth rate of protein crystals (Lysozyme) vs supersaturation under microgravity, in which convection was completely suppressed was for the first time measured in the Russian Recovery satellite, FOTON M-3. Although we expected the reduction of growth rate in space, the growth rate was the same as under gravity or even larger than under gravity. This increased growth rate was interpreted due to the reduction of impurity particles (dimers) which retard the movement of growth steps. Some implication will be given from these conclusions to the crystallization in solar nebula, like chondrule and cosmic dust formation.