

Preparation for nucleation experiment of ice nanoparticles by the low-temperature gas evaporation method

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Nanoparticles with the size of ~100 nm are ubiquitous in space and serve as substrates for molecular formation and become building blocks of planets. Therefore, understanding their composition, size, and abundance is very important to understand material evolution in space. Especially, ice condenses homogeneously or heterogeneously on other mineral particles depending on an environment after a heating event in the early planetary system. Therefore, elucidation of nucleation conditions of ice is essential for discussions on planet formation and astrobiology. In this study, we have established a new experimental method for formation of ice nanoparticles and in-situ observation of its formation environment to determine two important physical parameters (surface free energy and sticking probability) of ice nanoparticles. Here, the concept of our study and experimental system named ALADDIN; Advanced Laboratory Apparatus for Direct Detection of Ice Nucleation, will be presented.

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