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Ion-induce nucleation experiment II: free energy of the water-cluster ion

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Ion-induce nucleation in gas phase is an important mechanism for grain formation in various circumstances. However, the number of works regarding this formation mechanism is very limited. To investigate the elementally processes of ion-nucleation mechanism, we recently developed a new apparatus (See, the presentation by N. Watanabe in this session). Using this apparatus, the cluster ion formation with an ion core mass-selected, which is the first stage of nucleation, can be observed quantitatively. In this presentation, we show the results of experiment on water-cluster ion formation in which free energies with the size of cluster have been determined. The experiment was performed at temperatures in range of 230-400 K with the supersaturation ratio of about 10^{-3}-10^{-2}.

Keywords: interstellar grain, cluster ion, nucleation