Laboratory development for the study of interstellar surface chemistry

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It is suggested that interstellar complex organic molecules (COMs) may give rise to the chemical complexity on planetary surface. These COMs are proposed to be formed on the ice surface of dust grains in molecular clouds. We present the experimental apparatus designed for simulating the environments of the interstellar clouds to study the chemical process underlying the formation of these COMs. The apparatus includes a main ultra-high vacuum chamber with 10^{-10} mbar base-pressure. The experiments will be conducted by feeding gas into the chamber through gas deposition lines, onto the liquid nitrogen-cooled substrate to form an interstellar ice analog. The ice will be irradiated by VUV, with a source equipped to the chamber. Then, mass spectroscopy and FTIR spectroscopy will be used to identified the chemical products. Finally, we present the progress of the manufacturing process as well as the development plan of the apparatus.