

## **Cosmic dust formation at cryogenic temperatures**

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The growth of cosmic dust grains at the low temperatures of the interstellar medium (ISM) can proceed through the action of interstellar UV radiations on atoms and molecules condensed on preexisting solid nuclei acting as seeds. Despite the low temperatures, the energy carried by the interstellar UV photons can trigger chemical reactions between the condensed species, thus producing the various substances that constitute cosmic dust grains. It is thought, however, that interstellar silicate grains, which represent a major portion of cosmic dust, grow in dense clouds where not only temperatures are in the range 10–50 K but also UV bombardment is blocked. Thus barrierless chemical reactions that are spontaneous at low temperatures can be expected to play a role in the growth of interstellar silicates. Consequently we have started a project to study the formation and growth of silicates at cryogenic temperatures. In a first stage we have investigated the condensation of SiO molecules, which are the main source of Si atoms in the gas phase in the ISM. In experiments conducted at 0.37 K in superfluid He droplets and at 6–12 K in Ne matrices, we have observed, respectively, the formation of SiO oligomers and the condensation of SiO grains of micrometer size. We conclude that there is no energy barrier that prevents the condensation of SiO molecules into chemically bound grains at the temperatures of the interstellar medium. The relevance of these experiments will be discussed and their results presented before introducing the latest progresses of our project.