

Laboratory experiment on the production of perovskite by the coalescence between CaO and TiO₂ particle

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In a previous paper, we produced crystalline forsterite dust by the coalescence between MgO and SiO₂ smoke particle. In this experiment, the perovskite(CaTiO₃) particles were directly produced by the coalescence growth between CaO and TiO₂ smoke particles. Spherical particles with the size of 100-200 nm order were produced. In the oxygen rich stars, the stable solids are the refractory oxides of Al₂O₃ and CaTiO₃ at temperature higher than 1500 K. These initial oxides were easily transformation into other products. But the Al₂O₃ and CaTiO₃ also can be seen in the CAI in carbonaceous chondrite. The optical data and formation on the perovskite hardly be done. By the increase of the observation data for a wide range of spectrum, the existence of perovskite as well as corundum will be observed. Since TiO, TiO₂ and CaO dust have been observed, the growth of the perovskite may take space by the coalescence. In this paper, we also produced massive amounts of perovskite powder in Ar gas (10 Torr). The optical spectra at 14.4 and 21.88 μm can be identified as the perovskite. The evaporation source problem in laboratory experiment was also discussed on the formation of the perovskite.