Condensation process of silicate vapor at the chondrule formation

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Chonrules are believed to have been formed through melting and resolidification ofcondensed aggregates in the protoplanetary disk. This means that there existed a high temperature condition followed by an appropriated cooling in the protoplanetary disk. Chondrules precursors were heated to temperatures of 1500 to 2000 K. A realistic dust would have a continuous size distribution of grains. The smaller grains would reach the melting point earlier and could vaporize while larger grains are in the process of melting. The resulting silicate vapor would condense in the cooling. It is possible for the chondrules to be nuclei under appropriate condition when the condensation proceeds. If there are enough chondrules, most monomers in the vapor gas would condense on the surface of the chondrule. On the other hand, if the number of the core grains are not enough, new nuclei are formed through homogeneous nucleation. In this study we examine a process of competition between the homogeneous nucleation and the core-mantle type grains. We obtained the analytic expression of the condition to form new nuclei by the homogeneous nucleation. We have new constraint on the mechanism of the chondrule formation by comparing the condition with the textures of chondrule rims and matrix.