

Effect of the sintering shrinkage on the evolution of surface density distribution of dust component of a protoplanetary nebula

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Dust grains grow through collisional sticking in a protoplanetary nebula. A dust aggregate infalls to the central star due to gas drag. The infall velocity depends on the size and density of the aggregate. The temperature of the aggregate rises as approaching to the central star. The high temperature may cause sintering of the aggregate. Sintering leads to the shrinkage of the aggregate, which affects the infalling velocity. I conducted a numerical simulation of the evolution of dust surface density distribution with the effect by shrinkage. It was found that the surface density decreases by a factor of 10 for aggregates of 10cm radius and 99% porosity. This result suggests that the sintering shrinkage affects the evolution of the dust surface density distribution.