Collisional Experiments of Sintered Glass Beads at Very Low Velocities

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Collision, sticking and aggregation are one of important processes in the formation of solar system. At growth of dust aggregate of an initial stage in the planet formation, surface energy works more dominantly than gravity, whereas at collisional destruction and growth process between small bodies, fragments reaccumulate due to their own gravity.

Efficiencies of sticking and reaccumulation depend on energy dissipation at impact point. In order to investigate energy partitions in the collisional destruction of solid objects, we will study the dynamic response against very low-velocity collision of sintered bodies (glass beads) for which we can control the structure and static strength.

The usage of sintered bodies has an advantage in simulating porous structures that are common in small bodies in the solar system.

Samples were made of soda lime glass beads whose softening point is 500 to 700 degrees C.We examined tensile strength of the neck formed by heating at 600 degrees C for 4 hours. We got a preliminary result in which the strength of the neck, docking area between the beads, was an order of magnitude lower than the tensile strength of soda lime glass.

We will summarize the relation between the shape, the size of the neck and the tensile strength.

We performed collision experiments between spheres of the sintered glass beads having diameter of 4cm at very low velocity. We will report the relation between collisional velocity and degree of destruction.