

PPS020-P06

Room:Convention Hall

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Expansion velocity of the impact vapor cloud

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The vapor cloud is generated by hypervelocity impact of the planetesimals and the protoplanets in space. This is called a impact vapor cloud. As for this, the shape of the cloud is different depending on the impact velocity and impacting material, etc. It is said that Expansion velocity of impact vapor cloud is proportional to the sound velocity (which is defined from the pressure and the density of the nylon prejectile after passing of the

shock wave) regardless of the impact velocity and angle and the target material. The early experiment concerning expansion velocity has only been carried out with the exact materials. But, the planet that impact in space is a porous quality.

So, we carry out an equivalent experiment with the experiment that uses the porous quality materials for the projectile. The impact vapor cloud generated in that case is taken pictures with the high-speed camera, and analyzed in the present study. We consider the relation between the void ratio and the expansion velocity by using these results.

As the result, the expansion velocity is about twice that of the sound velocity, and is consistent with theoretical considerations.

Because the influence by the void ratio is included in the elicitation process of the sound velocity, it is necessary to take the void ratio into consideration in the relation between the expansion velocity and sound velocity.

Keywords: Highvelocity impact, Impact flash, Vapor cloud, Lunar impact flash