The Absorption Spectrum Measurement of a Laser-induced Vapor Cloud

Takenori Yoshikoshi[1]; Seiji Sugita[2]; Ko Ishibashi[3]; Toshihiko Kadono[4]; Takafumi Matsui[5]

[1] Department of Earth & Planetary Phys.

Faculty of Sci.,

Univ. of Tokyo; [2] Dept. of Complexity Sci. & Eng., Univ. of Tokyo; [3] Earth and Planetary Sci., Univ. of Tokyo; [4] IFREE; [5] Grad. Sch. of Frontier Sci., Univ. of Tokyo

http://www-sys.eps.s.u-tokyo.ac.jp/yosikosi/

Impact phenomena occur at the formation of Solar System universally. Impact phenomena attributed to formation of planetary atmosphere . In the high temperature area, reaction time scale is shorter than that of expansion, so components of vapor plume change at thermodynamic equilibrium state. As colder the vapor plume is, as longer the reactions timescale are. Finally, the reactions timescale are longer than that of expansion and reactions quench. The components at quenching state are equal to final components.

Absorption spectroscopy method is reasonable in low temperature region. It is important to develop the absorption spectroscopy method. At first, Our purpose is to confirm that we could really measure absorption spectra through vapor cloud in our study.

We used laser irradiation to simulate vapor cloud and Quartz-Tungsten-Halogen Lamp for a light source. We concentrated the emitted light from the light source by lens, focused in vapor cloud and focused on a detector again. We use copper for target because it is simple and reasonable.

Under these environment, we measured the spectra over 324.8nm which is the most radiation and absorption wavelength of copper. We could detect a copper radiation spectrum immediately after the laser irradiation. At the time passed, we could detect a absorption spectrum. Absorption strength is 6 times larger than noise, so we concluded that we could measure absorption spectrum.

In this study, we know that we can measure absorption spectra. We will report about the absorption spectra through the vapor cloud induced from carbonaceous compound.