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Study of carbon-bearing materials formed by impact process on the Moon

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Introduction:
In the solar system (terrestrial planets), it is required to study overall processes of volatile carbon between planets (with and without global air and water) and the Moon without global air. Recently author has studied such complicated and unsolved problems [1-4]. In the present paper, the collision formation of carbon-containing materials is mainly to discuss it on celestial bodies without global air (the moon, asteroids and Mercury) that do not have the atmosphere, especially on the moon [3].

Volatiles in the Moon :
The Moon has original reservoirs of carbon-bearing volatiles from successive growth of fine dust particles to become celestial body size. However, the Moon is close to planet Mars size, but the volatiles- reservoirs are difficult to keep during characteristic abrupt collision process to be escaped away[1-3].

Problem of carbon dioxides atmosphere :
Water vapor changes liquid phase by quenching process. However, carbon dioxides-rich atmosphere keeps in a gaseous state by relative cooling, so that it should be taken into something to hot air estimated from the experimental results. In this sense, Mars and Venus with carbon dioxides-rich atmosphere are difficult to form global water system if a global water should be present before global gas-rich system[3]. The Moon is therefore celestial body to discuss the interior carbon-bearing volatiles [3].

Formation of carbon-containing materials of the Moon:
Because the Moon has no atmosphere globally, two-stages growth of separated carbon-rich macro-grains with high-pressure form cannot be expected because of no collision with global air on the airless Moon [3]. It is only possible to growth macroscopically in the shallow interiors (from dust-growth or fragments of air planet separated) by successive meteoritic collisions on the surface[4]. Carbon-bearing materials on the Moon are localized and minor contents of carbon-bearing materials in the glass, carbon, carbide and carbonates related with shock-wave processes[1-3].

Problem of global water on the Moon:
It might discuss possible formation of global air and water on the Moon and celestial bodies from experimental results. From laboratory experiments, carbon-bearing air which might be possible to generate a global water on air- planets of Mars and Venus is generally difficult, but it is not impossible by the proposed two methods ideally. On the other hand, formation of global water on air-less Moon (also Mercury and asteroids) is relatively very difficult, but it might be not impossible if the Moon becomes global air-bearing celestial body prepared by any proposed process[3].

Summary:
1) Formation of the atmosphere and seawater to any celestial body such as the Moon, can be discussed from experimental results of carbon-containing materials formed.
2) Carbon dioxides atmosphere can be reduced or cooled from state-condition of hot gas by any proposed experiments.
3) Lunar carbon-bearing grains of glass, carbon, carbide and carbonate can be grown microscopically and locally in the interior by successive process of impacts.

Reference:[1] Miura Y. (2011): LPSC 42(2011), #2817.
[2] Miura Y. et. al. (1996) Antarctic Meteorites XX1(Tokyo), 107-110.
[3] Miura Y. (2015): LPSC2016 (LPI), #1811, #1666.
[4] Miura Y. (2009): Patent application.

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