ESTIMATED SOURCES OF SPHERULE-CHAINED TEXTURES WITH CARBON IN THE LUNAR BRECCIAS. Yas. Miura, Yamaguchi University, 1677-1 Yoshida, Yamaguchi University, 753-8512, Japan (dfb30@yamaguchi-u.ac.jp)

Introduction: Main carbon storages on water planet Earth are reported in the present life-materials with short cyclic periods. whereas the Venus and Mars without present sea-water have atmosphere with carbon dioxides gas. Smaller asteroids (or meteoroids) without air and ocean contain carbon mainly in the solid rocks as in carbonaceous meteorites, which is the similar situation on the Moon without ocean and air. The main purpose of the paper is to discuss origins of carbon and carbon-bearing texture with spherule-chaines probably found in the lunar breccias [1, 2].

Carbon characteristics found in the three states: Carbon can be found in three states of gas (as carbon dioxides in atmosphere of the Venus or Mars), liquid (as ions in water and life-materials of the Earth) and solid (as rocks) in Earth-type planets. In this sense, the Moon has carbon in lunar rocks, together with meteoroids of asteroids (Table 1).

Table 1. Three states of carbon-bearing materials of Earth-type planets and the Moon.

1) Gas (as carbon dioxides in atmosphere):
On the Venus and Mars (as major sources)
2) Liquid (as ions in various water and life-materials)
On the Earth
3) Solid (as rocks)
On Earth-type planets, the Moon & Asteroids .

Carbon storage-features on the mineral-rocks: Carbon-bearing solids in large sizes (more than mm in size) are found in various Earth-type minerals and rocks with stable growth (as one of state of material circulation), which is included in organic to inorganic cycles of life-materials. On the other hands, carbon-bearing materials (as in smaller sizes of nm scale) formed by rapid transformation of dynamic reaction are found various types of minerals and rocks, such as those of the Moon, Earth, Mars and meteorites (Table 2).

Table 2. Various carbon storages in mineral rocks.

1) Large sizes (more than mm scale):
Various types of Earth-type minerals and rocks
(with short cycles of materials with stable growth)
2) Smaller sizes (nm scale):
Rapid transformation with long cycles
(on the Earth-type planets, the Moon & Asteroids

Carbon-bearing materials in the Moon: The Moon has carbon-bearing materials as the following states [1, 2]:

1) Inside the glass and breccias (type A): Carbon is easily mixed with various glasses and breccias during high temperature and pressure formation, which is stored in atomic dimensions in trace or minor contents.

2) *On the lunar breccias (type B):* Carbon-bearing solids transformed from carbon dioxide gas are fixed on previous solid minerals and rocks mainly by dynamic reaction of impact processes on the Moon, which is found in the lunar breccias with minor contents.

3) High-pressure type of lunar interior (type C): There is few high-pressure type carbon of diamond on the Moon with less size of total rock pressure, only the way to find high-pressure type of diamond carbon in the lunar interior is considered to be shock-wave explosion by moonquake which will be found mainly at geological boundary between the highland and lunar Mare in the next lunar-exploration.

4) Spherule-chained or nano-bacteria-type textures in the Moon (type D): There is few texture with spherule-chained or nano-bacteria-type by the above-mentioned cases of carbon-bearing materials on the dry and airless-Moon (even by impacts by meteoroids on the Moon), only the way to find spherule-chained and/or nano-bacteria-type textures with iron-rich oxides are remnants by giant impact process mainly from air and water-planets (Fig.1).

Fig.1. Estimated spherule-chained texture found in lunar spherules or breccias (as type D carbon with iron).

Summary: Results are summarized as follows. 1) Carbon-bearing materials with three states are found as smaller solids on the Moon. 2) In four types A-D of carbon-bearing solids, spherule-chained and/or nano-bacteria-type textures (Type D) will be formed by giant impact mainly from air and water-planets.

References: [1] Miura Y. (2009). LPI Contrib. No. 1515 (LEAG 2009), 2042, 2043. [2] Miura Y. (2010): *LPS XL*, Abstracts #2462, #2489.