

Solids and Fluids of volatile (carbon)-bearing materials on Asteroids and Martian Moons

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Introduction

Asteroids and Moons (of Earth and Mars) are studied mainly from material sciences of mineral and texture with formation ages by using database of Earth' rocks and collected meteorites (Asteroids and Earth's Moon), where the collected meteorites show quenched texture and limited mineral-solids without remained fluids. The main purposes of the paper is to elucidate formation processes of solids and fluids of Asteroids and the Moons.

Solidified fluids on meteorites:

Remained fluid-water cannot be obtained at meteorites and Moon (Earth) rocks, because global water (on Earth) with formation of many mineral series and rock kinds cannot be confirmed. Fluid formation of these meteorites are rapidly solidified to be formed groundmass among chondrules and/or phenocryst of crystalline minerals. This indicates that fluids are formed quickly and changed to non-crystalline aggregates to fix solids of chondrule crystalline grains from meteorite texture.

Solidified micro-grains produced by laser melting:

Author has produced quick fluids texture during laser sputtering experiments of carbon-bearing rocky grains in this study. This indicates formation of fluid liquid phase from solid mineral to quenched grains though there are no previous fluid water in the sample before laser sputtering process..

Similar heating experiment of carbonaceous meteorite produces only water after heating reaction though there are no water before heating.

The present experimental results indicate that there are any elements, ion and elements of fluids (water and carbon dioxides) are existed separately and combined by extreme conditions of high temperature and pressure, which can explain clearly the poor mineral and rock kinds compared with water-planet showing circulated fluids and water supply by interior activity.

Carbon-bearing materials formed at collisions on asteroids.

Almost all evaporated elements are disappeared without any remained solidified materials (except carbon-bearing grains) after impacted collision on Asteroid surface. In fact, we can observed solidified carbon-bearing nano-grains on the Moon rocks (Africa and Antarctica) and chondritic meteorites (ordinary to carbonaceous samples), which indicate that the Moons and any Asteroids have volatile carbon-bearing materials on the surfaces.

Expected space explorations for the Moons and Asteroids:

Among many Asteroids, volatile (carbon)-bearing materials are produced for active multiple collisions (including impact crater sites) or largely broken small bodies by huge collision, where many material resources with volatiles (carbon and/or hydrogen) are expected to be find for next human resources on space world in future.

Summary:

Natural resources of volatile (carbon)-bearing materials on the two Moons (Mars) and Asteroids are expected for next target for sample collection and material circulation sites for limited living bases in future, which are obtained by meteorite analyses and artificial laser experiments.

Keywords: Solids and Fluids , Volatile (carbon)-bearing materials , Asteroids and Martian Moons

