

FORMATION OF VOIDS TEXTURES IN METEORITES.

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Introduction: Meteorites from Asteroids are considered to be mixtures of vapor-liquid-solid. (VLS in this paper) on solid-rich rocks. Different from planet Earth with three VLS systems covered on solid system, Asteroids have few air and liquid systems on solid rocks. The main purpose of the paper is to present basic outline of meteorites with micro-mixtures of the VLS states.

Mixtures of three states in meteorites: The three phases of the VLS states are found in any meteorites as impacted micro-mixtures (without any air and water systems around the rocks) as follows [1-5]:

$$M_{\text{total}} = M_v + M_L + M_S \quad (1)$$

In the equation (1), M_{total} , M_v , M_L and M_S mean total materials, vapor, liquid and solid materials, respectively.

Planets with atmosphere and/or ocean water system: Any Earth-type planets of the Solar System are considered to be any micro- and macro-mixtures of the three VLS states as follows:

1) Planet without macro systems of air and water (*i.e.* Mercury, also the Moon) is just increased from large Asteroids with the three states M_{total} as shown in the equation (1).

2) Planet with macro air system and without water system (*i.e.* Venus and Mars) is considered to be evaporated from the interior to form macro-air (CO₂-rich) system, shown as solid state M_{total} with two fluids and solid states M_L and M_S .

3) Planet Earth with major two air and water systems is complicated formation to form water system (such as giant impact to be evaporated from the older interior), shown as solid state M_{total} mainly with solid state M_S in the equation (1).

Voids textures in meteorite: Meteorites from any Asteroids show relatively voids-bearing texture, because they are impacted mixtures by formation processes (without air and liquid systems around the Asteroids) [4, 5].

Evidences of voids-bearing textures: The Antarctic meteorites (Yamato86032 etc.) and Nio (Yamaguchi) chondrite reveal the following textures [1-5]:

- 1) Various sizes (100nm to 0.1mm) of voids are connected to meteorite surfaces of the fusion-crust to the interior deeply.
- 2) There are some voids-bearing textures in deeper interior of the meteorites as basic impacted textures.
- 3) Shapes of macro-voids in the fusion-crust are almost circular, though micro-voids reveal rounded to irregular shapes with clear-rounded to rim-deposited textures from melted inclusions.
- 4) The micro-voids textures with irregular arrangements in meteorites are considered to be formed in meteoritic interior-remnants of meteoritic interior solidified process during impact process of meteorite formation.
- 5) The present micro-voids texture formation can be applied to any Antarctic meteorites and Asteroids samples.

Summary: Voids-bearing textures are remnants of impact process with three VLS states kept in the interior of meteorites.

References: [1] Miura, Y. 2011. *Solid 2011*, #9013. [2] Miura Y. 2012. NTMS-2012 (Houston), #3100. [3] Miura Y. 2012. Met. Soc. Meet 75th (Cairns), #5115. [4] Miura Y. 2012. SBAG Science, #9013. [5] Miura Y. 2013. 44th Lunar and Planetary Science Conference. #1654, #3098.