

## In-situ observation of formation process of carbon-rich minerals in several sites of Yamaguchi, Japan.

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1. Characteristics of carbon minerals: Carbon-bearing minerals are significant minerals to show the detailed formation process. Dynamic samples might elucidate new information of micro- to macro-carbon minerals, which are main purposes of the present paper [1-4].

2. Carbon-rich minerals from Yamaguchi Prefecture: Present carbon-bearing samples are used from three sites (Yamaguchi) and one site (Shimane) to compare dynamic formation processes[1-4].

3. Microscopic observation of carbon-containing minerals: Microscopic carbon-bearing minerals are obtained at the following six location-samples as follows [2-4].

1) Point A: Historical sample-site of basalt with phlogopite and feldspar contains microscopic carbon-bearing grains quenched as flake texture found in this study.

2) Points B: Basalt with phlogopite and feldspars shows more detailed grains and texture with tube-shaped texture with progressive change of carbon-contents. The present observation is new result to be found as carbon-separated concentrations during fluid-solid reactions shown as flake quenched texture.

3) Points C: Basalt phlogopite mica and feldspar shows carbon-bearing materials with quenched flake texture and tube-like textures.

4) Points D: Basalt with phlogopite minerals contains carbon-bearing grains with flake and tube-like textures.

5) Point E: Basalts with feldspar minerals (without any phlogopite) shows carbon-bearing grains on feldspar minerals.

6) Points F: Carbon-rich grains can be found separately on feldspar surface (without phlogopite).

4. Identification of carbon minerals: Carbon-rich grains from point B have been investigated by X-ray diffraction and Raman Spectroscopy, where the characteristics of high pressure-type carbon minerals(diamond-like) have been obtained in this study.

5. Formation of high-pressured carbon minerals: Dynamic process and tube-like texture indicate carbon-separation from carbon-bearing minerals during shock wave processes of volcano and impact process.

6. Summary: Carbon-rich grains of high-pressure form (microscopic diamond) are obtained on the Yamaguchi samples (grain B) compared with other samples in Japan, where carbon-separation and concentration can be developed along solidified tube-like and fluid-like process with quenching found in the study.

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