

## Material change of carbon- and chlorine-bearing states and its application

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Results are summarized as follows:

- 1) Material changes of carbon and chlorine are summarized from their characteristics of circulates system.
- 2) Carbon and chlorine are appropriate elements of circulated system due to their formation of stable phases among three states of gas, liquid and solid.
- 3) Previous interpretation that carbon materials cannot be formed at volcanic rocks, however author found that carbon-bearing materials are found at volcanic basalts on the surface at Shimonoseki, Yamaguchi, Japan.
- 4) Chlorine-rich grains with akaganeite composition are found with electron microscopic study in the Nio, Kuga and Carancas meteorite samples in fusion crusts by author recently.
- 5) Examples of materials changes of these elements are shocked formed and quenched carbon-bearing materials and chlorine-bearing akaganeites.
- 6) Akaganeite crystal formed at normal and static reaction shows clear differences with its texture and size formed by dynamic shock metamorphism.