

Texture and permeability change by hydrothermal fluid flow through powdered volcanic glass

Hiroshi Isobe[1]; Shingo Takeuchi[2]

[1] Dept. Earth. Sci., Fac. Sci., Kumamoto Univ; [2] Geological Survey of Japan, AIST.

Super-critical hydrothermal fluid flow experiments were carried out with powdered rhyolitic volcanic glass and dacite. Experimental temperature, pressure and flow rate are 450-400 C, 50 MPa and 0.1 ml/min, respectively. Initial permeability at room temperature is approximately 10^{-12} m². Textures of run products show that dissolution of volcanic glass progressed with run duration in upstream region. At downstream region, alteration products of the volcanic glass including cristobalite, plagioclase with minor kaolinite and illite occur in grain boundaries of the obsidian powder and cemented grains within a few days. Gas flow tests of run products also show increase of permeability with run duration at upstream region. Permeability of downstream region sample is less than one tenth of the upstream region. Hydrothermal dissolution and alteration brought promotion and obstruction of fluid flow itself through powdered volcanic glass media.