

Study on the generation process of hydraulic fracturing of high temperature ductile rock under confining pressure

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In recent years, attention has been focused on supercritical geothermal power generation as next-generation energy. But the environment deep underground has not been clarified. In particular, water permeability may be inadequate. Therefore, it is necessary to know deeply about hydraulic fracturing in a supercritical geothermal environment. In past studies, hydraulic fracturing experiments carried out with load control, but since the specimen is crushed excessively after crushing with water, so experiments using displacement control were conducted.[shigemistu,2021] In his study, no cracks could be confirmed by X-ray CT. Therefore, in this study, cracks due to experiments using displacement control were visualized by Fluorescence microscope observation. In addition, in order to elucidate the crack growth process, water injection was stopped halfway and the specimen was taken out. The higher the water pressure in the borehole at the time of stopping, the higher the permeability. From this, it can be said that the crack gradually develops as borehole pressure rises. In addition, microscopic observation confirmed cracks with a large opening width only when stopped near the confining pressure and when completely crushed. From this, it can be seen that when the borehole pressure reaches the vicinity of the confining pressure, the existing minute cracks open greatly. However, since only a few hydraulic fracturing experiments have been conducted in this study, it is necessary to increase the number of data.