

A dissolution test for understanding water-rock interaction in waste rock muck under rain events

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Objective

Drained water from rock fill consisting of waste rock muck sometimes contains heavy metals or arsenic. To treat the waste rock muck by an environment-friendly and economical way, we should understand the water-rock interaction in the rock fill after rain. Thus, we have newly developed a dissolution test for rock, considering rain events.

Method

We conducted dissolution tests for a volcanic rock sample using a cylindrical column. Firstly, we crushed the sample to particles of 2mm to 20mm, and filled them into the columns. Secondly, we saturated the particles in the columns with pure water. One hour after, we collected drained water by gravity. Thirdly, after preservation periods of one, seven and 14 days, we processed the columns in two ways. In type-1 test, we collected pore water by centrifugation. In type-2 test, we re-saturated the columns with pure water and collected re-drained water by gravity. Then, we analyzed collected water.

Results and Discussions

The concentration of the pore water (*CP*) and that of the re-drained water (*CR*) became higher as the preservation periods became longer (Fig.1). Additionally, the *CR* was higher than the concentration of the drained water and lower than *CP*. These results suggest *CP* become higher with time as a result of water-rock reaction, and pure water added for the re-saturation is mixed with the pore water and re-drained. We guess this process occurs in rock fill at each rain event.

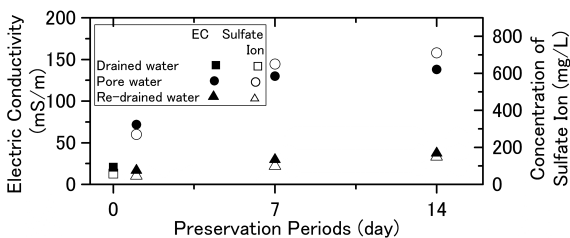


Figure 1: Results of the dissolution tests.