

## 8. Effects of Temperature Change on the Mechanism of Heavy Metal Leaching from Clay

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Our study focused on the effects of changes in soil temperature on the leaching characteristics of heavy metals from soil and verified these effects through experiments. It has been pointed out that the recently expanding use of geothermal heat may affect soil temperatures; however, few studies have examined the effects of temperature change on soil in Japan.

We sought to confirm the temperature dependence of leaching characteristics by performing diffusion tests under different temperature conditions with clay containing geogenic heavy metals. The results showed that higher experimental temperatures accelerated diffusion leaching from clay. Increasing the temperature of the clay samples by 40°C increased the diffusion coefficients by about 5 and 10 times for boron and fluorine, and about 3 times for sodium and potassium, confirming that temperature dependence varies depending on the substance. These results indicate that large temperature changes in ground containing hazardous heavy metals increase the risk of groundwater contamination. Thus, plans to use geothermal heat should account for the effects of temperature on the leaching characteristics of heavy metals and seek to determine the range of acceptable temperature changes.

**Key words:** Heavy metals, clay, diffusion leaching, temperature change