

## **Prediction of cesium sorptive property on heterogenetic illite of hydrothermal deposit**

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Illite is one of major sorptive minerals for radiocesium (Cs-137) in the soil environment. Although illite is commonly regarded as a mono-phase mineral, natural illite (especially, hydrothermally altered illite) has heterogeneous assemblages such as illite, sericite, and/or muscovite. This heterogeneity of illite could affect the geochemical sorption properties on Cs-137, but it was rarely studied. This study evaluated the sorptive properties of heterogeneous illite using mixture concept of illite and sericite, and predicted the cesium sorption of natural illite in hydrothermal deposit.

Natural illites were collected at the hydrothermal deposits of the Yeongdong in Korea. These samples consist of illite, sericite, quartz and minor albite. The contents of illite and sericite ranged from 8–47% and 0–51%, respectively. The statistical analysis indicated that the amount of illite had significantly positive relationship with  $K_{d,Cs}$  of cesium, while sericite exhibited comparatively negative correlation. The prediction equation of  $K_{d,Cs}$  for heterogeneous illite was developed using the Freundlich nonlinear model based on individual contribution of illite and sericite to cesium sorption. The predicted  $K_{d,Cs}$  values matched well with the experimentally measured  $K_{d,Cs}$ , showing that all points were plotted on the 1:1 plane. These results suggested that the  $K_{d,Cs}$  prediction of this study could be feasible for general application to estimate rapidly and accurately the cesium partitioning coefficients in the heterogeneous illite-containing soil environments.