

Geochemical characteristics of seepage water from an adit of a copper vein-type deposit, Akita prefecture

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Abstract

Chemical analyses of seepage water from an adit of a certain vein-type deposit were performed using PIXE analyses and ion-chromatography to determine characteristic features of the flow system of ground water in a mining area. The deposit investigated in this study is a Cu vein-type deposit in mudstone, sandstone and dacitic tuff breccia of Miocene age. Two kinds of ground water that seeps through cracks of a ceiling of the adit were examined. These seepage waters are ground waters that migrate a distance of about 200m from the ground surface to underground adit. These seepage waters are divided into two types: seepage water having a pH value of 3.4 with high Ca, Mg and SO_4^{2-} concentrations and seepage water having a pH value of 6.2 with Na, Cl⁻ and HCO_3^- components. First type seepage water is characterized by higher Cu and Zn concentrations than the Cu and Zn concentrations of latter seepage water. On the other hand, Fe concentrations of both seepage waters are low and similar. This fact suggests that the Fe concentration in seepage water is controlled by precipitation of iron hydroxide at a shallow underground part, although dissolution of sulfide minerals progresses by interaction between water and sulfide minerals such as pyrite, chalcopyrite and sphalerite.