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Geochemical characteristics of Au in the water systemfrom abandoned gold mines area

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The AMD (acid mine drainage) poses a threat not only to the aquatic life in mountain streams and rivers, but can also contaminate groundwater and downstream water bodies. Besides pyrite, sulfides of copper, zinc, cadmium, lead and arsenic in the drainage tunnels and tailings piles also undergo similar geochemical reactions, releasing toxic metals and more H+ into the mine drainage. The fate of gold in the AMD system is reduced and precipitated with iron oxides by oxidation-reduction reaction between ferrous/ferric iron and Au3+/Au0. The objective of this study was to investigate the influence of the transport characteristic on the distance through distribution of heavy metals and gold on the interrelation between acid mine drainage and sediments in the abandoned Gwang-yang gold mine, Korea. We conducted to confirm the chemical (chemical analysis and sequential extraction) and mineralogical property (XRD, SEM-EDS and polarization microscope) from AMD, sediments and tailing samples. The result of chemical analysis showed that Fe contents in the AMD and sediments from the upstream to the downstream ranged of 10.99 to 18.60 mg/L and 478.74 to 542.98 mg/kg, respectively. Also the contents of Au and As in the sediment were respectively ranged from 14.06 to 22.85 g/t and 0.245 to 0.612 mg/kg. In XRD analysis of the sediments, x-ray diffracted d-value belong to quartz, geothite was observed. The results of SEM-EDS analysis revealed that iron hydroxide were observed in the sediment and tailing. The result of sequential extraction for Au from the sediment showed that Au predominated in 26 to 27% of Organic matter fraction(STEP 4), and 24 to 25% of Residual fraction(STEP 5).