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Heavy metal contamination at the Kanayama Bay in Shirahama-cho, Wakayama

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Influence of heavy metal contamination on ecosystem is one of the important problems in worldwide. In Japan, old days there were many mines but the closed mine waste water sometimes brings out metal pollution. Then, the Japanese Environmental Quality Standard of total zinc for water pollution was set in 2003, the effluent standard of zinc was strengthened in 2006.

In this paper, heavy metal contamination from the Kanayama mine was studied. The Kanayama mine was located in at the vicinity of Kanayama bay and closed in about 1955. The main ore minerals were sphalerite, pyrites, and galena. Mine waste water flows into the Kanayama Bay. Then, pH, water temperature, electrical conductivity(EC), oxidation-reduction potential(ORP) and flowing quantity are measured in field and concentrations of Fe, Zn, Mg, Mn, Pb, and Cu are measured by ICP AS in laboratory.

pH value for spring water near the closed adit are 3.06 to 3.31 and with high concentration of Fe and Zn. The spring water supplies 10.6 Kg/ year for Fe, 31.3 Kg/year for Zn and 5.2 Kg/year for Mg into the Kabnayama Bay with 0.49 m³/min of flow rate. Around the flow path of the spring water into the sea, there are no sea plants and just some kind of blue green algae and iron sediments were observed.

pH value for small river beside another closed adit are 6.57 to 7.89 and with the lower concentration of Fe and Zn than those of the spring water. The river water supplies 35.6 Kg/ year for Fe, 108.7 Kg/year for Zn and 162.3 Kg/year for Mg into the Kabnayama Bay with 71.3 m³/min of flow rate.

Keywords: heavy metal, mine wastewater, Kanayama mine