

Environmental magnetic survey of tailings of the Kamegai Zn-Pb deposit, Toyama, Japan

Kazuo Kawasaki^{1*}, SAKAI, Hideo¹

¹University of Toyama

Environmental magnetic results are reported for the mine tailings of the Kamegai Zn-Pb deposit at Mt. Hachibuse in Toyama, Japan. The Kamegai deposits had run between 1578 and 1944, leaving a great number of mine waste in the region. These mine waste could generate acidic waters containing high concentrations of sulphide and metals. The areas of mine waste at Mt. Hachibuse are generally characterized by little vegetation, only the fern is found. Magnetic property measurements, including in-field and laboratory susceptibility, hysteresis properties, isothermal magnetizations, and thermosusceptibility curves, are made in order to distinguish the soils between natural and anthropogenic origin. In-field magnetic susceptibility at Mt. Hachibuse shows the clear boundaries between them with higher susceptibility value of tailings. In addition, the susceptibility of soils under the fern shows the lower values than the surrounding tailings and anthropogenic soils. The main magnetic minerals are pyrrhotite, magnetite and hematite for tailings, magnetite and hematite for soils and pyrrhotite and magnetite for ore mineralization. Pseudo-single domain (PSD) to multidomain (MD) magnetite is generally found on all soils whereas single domain (SD) magnetite is found on the ore mineralization. Larger grains are dominant in the tailings compared to soils under the fern, implying that pedogenesis by plants likely changes the magnetic mineralogy. A variety of geologic, biologic and anthropogenic factors should be considered to interpret the origin of the magnetic signal in the region.

Keywords: Environmental magnetism, Mine tailings, Kamegai Zn-Pb deposit, Toayma