

Re-Os geochronology of the Hitachi VMS deposit, Ibaraki Prefecture: The oldest sulfide deposit in the Japanese Island

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We applied the Re-Os isotope dating method to the Fudotaki and Fujimi sulfide ores from the Hitachi Deposit in the Ibaraki Prefecture. The Re-Os isochron of the Fudotaki sulfides yielded ca. 540 Ma which is the oldest age among the all other metal deposits in the Japanese Island. This isochron exhibited excellent linearity and the Re-Os age of the Fudotaki sulfides is much older than a timing of contact metamorphism by the Irishiken Granites (Late Cretaceous). Thus, we interpreted this Re-Os age as a primary depositional age of the Fudotaki sulfides on a paleo-seafloor. On the other hand, the Re and Os isotope compositions of the Fujimi Deposit showed no correlation in the $187\text{Re}/188\text{Os}$ vs. $187\text{Os}/188\text{Os}$ space. The Fujimi sulfides underwent higher grade metamorphism than that of the Fudotaki sulfides up to epidote-amphibolite facies or granulite facies, and the Re-Os isotope system of the sulfide ores was disturbed by metamorphism. Since the Hitachi Deposit is a syn-genetic sulfide deposit, the eruption age of the wallrock (basic volcanic rock) is also estimated to be ca. 540 Ma. This Re-Os age obtained here will be an important age constraint to clarify the geological history of the Japanese Island.

Keywords: Re-Os age, VMS deposit, Hitachi Mine, Fudotaki Deposit, Hitachi metamorphic belt, Japanese Island