

Separation of HDO in water solution

TUSIMA, Katsutoshi^{1*} ; MATSUYAMA, Masao¹ ; KAMIISHI, Isao²

¹University of Toyama, ²National Research Institute for Earth Science and Disaster Prevention

Accident of Fukushima First Atomic Power Generation (May, 2011) produced a lot of radioactive pollution. Amount of pollution exceeded more than 0.4 million ton and stored in tanks (1 thousand ton for each tank). Stored water increases even now. One of problems awaiting solution is to separate HTO and reduce water pollution. The separation has been considered difficult or impossible because HTO was isotope of water with no chemical difference. However, if we attend to the difference in physical property such as melting point (HTO +2.24 deg C, HDO +0.190 deg C, H₂O 0.00 deg C), we may be possible to separate HTO from polluted water. Ice contained HDO (1 to 5 %) was planed and its powder of ice was mixed with mother liquid in vacuum flask. The melting point of liquid lowered around 0.01 deg C from the value of initial liquid after several days. This means about half part of HDO molecules transferred to solid from liquid. Ice grains immersed in polluted water occurs grain coarsening, the frozen HDO molecules will be buried in larger grain, on the other hand smaller particle melt and supply HDO to liquid. Method of increase of separation ratio is subject.

Keywords: separation of HTO, melting point, HDO solution, radioactive polluted water