

Evaluation of the Integrity of Tritium Storage Vessel Material in Hydrogen Environment

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Abstract

The integrity of tritium storage vessel material was evaluated with considering the the most important problems for the safety of tritium removal facility. The research for tritium storage could be divided into two parts, one is for the metal getter of tritium and the other is for the integrity of tritium storage vessel. Especially, the integrity of tritium storage vessel is up to the tritium embrittlement of vessel material, for tritium vessel is mostly made of metal material. In this work, the evaluation of the tritium embrittlement for the tritium storage vessel material is performed with the equipment that is made for high temperature and high vacuum. Hydrogen is used for this work, however, as tritium is the radioactivity material. In this work, carbon steel, austenitic stainless steel (SUS) 304 and 316L was chosen for experiment. The experiment was carried out for the several conditions of temperature and pressure and the time of hydrogen exposure. It is the tensile strength that is the key factor to evaluate the property change of vessel metal material. The obvious gap between SUS 304 and SUS 316L was not revealed, because the austenitic stainless steel is the high hydrogen resistance metal and the experiment condition may be not sufficient to show the difference between SUS 304 and SUS 316L