

P-174

600°C 및 650°C 납-비스무스에서 316L, HT9, T91 의 부식특성 연구
Corrosion Characteristics of 316L, HT9 and T91 at 600°C
and 650°C Lead-Bismuth

송태영[†], 조춘호

한국원자력연구소

(tysong@kaeri.re.kr[†])

HYPER(HYbrid Power Extraction Reactor) is the accelerator driven transmutation reactor developed by KAERI(Korea Atomic Energy Research Institute) HYPER is designed to transmute long-lived transuranic actinides and fission products such as Tc-99 and I-129 HYPER adopts a fast neutron system and Pb-Bi is used as core coolant and target material The maximum allowable temperatures of fuel cladding and beam window are 650°C and 550°C respectively Pb-Bi corrosion is one of the main factors considered to set the limits of temperature and velocity Therefore KAERI planned Pb-Bi corrosion experiments, and a stagnant Pb-Bi corrosion experiment was performed for HYPER structure materials as the first step The test materials are HT9, T91 and 316L HT9 is the candidate material for HYPER fuel cladding. T91 is the candidate material for HYPER beam window The experiment was performed under both reduced and oxygen-controlled atmospheres. Oxygen concentration was controlled by adjusting H₂ and H₂O vapor ratio Controlled oxygen can make oxide layer to protect samples against Pb-Bi corrosion There was no dissolution attack for HT9 and T91 after short exposure time such as 500 hours, but some dissolution was seen for 316L sample Firm oxide layers were not formed for 650°C and 600°C samples when the oxygen content was 10⁻⁶ wt%