**ICFRM2007/81**  
**Experimental Study on Corrosion of Steels in Flibe thermal convection loop**

M. Kondo\(^a\), T. Nagasaka\(^b\), H. Nishimura\(^c\), N. Noda\(^d\), A. Sagara\(^a\), T. Muroga\(^b\), M. Nagura\(^e\), A. Suzuki\(^c\) and T. Terai\(^e\)

\(^a\)Fusion Engineering Research Center, National Institute for Fusion Science, Oroshi 322-6, Toki, 502-5292 Gifu, Japan  
\(^b\)National Institute for Fusion Science - NIFS, 322-6 Oroshi, 509-5292 Toki, Gifu, Japan  
\(^c\)Graduate School of Engineering : TOKYO, University of Tokyo, Nuclear Pressional School, 22 Shirakata-Shirane, Tokai, Naka, 318-1188 Ibaraki, Japan  
\(^d\)National Institute for Fusion Science, 322-6 Oroshi-cho, Toki-shi, 509-5292 Gifu, Japan  
\(^e\)Nuclear Professional School, Graduate School of Engineering, The University of Tokyo, 2-22 Shirakata-Shirane, Tokai-mura, Naka-gun, 319-1188 Ibaraki, Japan  
kondo.masatoshi@nifs.ac.jp

Compatibility of structural material such as JLF-1 is a key issue for the force-free helical reactor blanket concept. In the present study, corrosion characteristics of JLF-1, SS316 and 12Cr steels in a molten salt LiF-BeF2 (Flibe) were investigated by means of a corrosion test in a Flibe thermal convection loop. The thermal convection loop was constructed and operated for 500 hours for the corrosion study. The loop inventory was 120cc. The loop was made of SS316 steel tube. The operation temperature was 773 K in the low temperature region and 823 K in the high temperature region, and the temperature difference of 50 K in the loop made the convection. The rectangular specimens of JLF-1 (9Cr-2W), SS316 (18Cr-12Ni) and 12Cr steels were placed in the high temperature region and low temperature region of the loop to investigate the corrosion and mass transfer phenomenon. After the corrosion test, the specimens were extracted from the loop and rinsed in the NaCl-KCl pool at the temperature of 773K. The corrosion characteristics of the specimens were evaluated from surface observation, metallurgical analysis and weight loss measurement.

Number of words in abstract: 182

Keywords:  
Technical area: 41. Chemical compatibility and coatings  
Special session: Not specified  
Presentation: No preference  
Special equipment: No special equipment