Short Communication

Electrochemical Corrosion Behavior of Ferritic Steels in Molten (Li,Na,K)F

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The corrosion of ferritic steels in fluoride salts limits the development of advanced molten salt reactors. In-situ electrochemical measurements for B409M and B439 were performed at 700 °C in molten (Li,Na,K)F by potentiodynamic polarization and electrochemical impedance spectroscopy. The experimental results indicate that the current densities for B409M and B439 are approximately 631 and 738 $\mu\text{A}\cdot\text{cm}^{-2}$, respectively. The impedance spectra plots for B409M and B439 are both composed of two capacitance loops for the duration of a 100 h experimental test. Cr-depleted corrosion layers are formed on the surface of B409M and B439 through fluoridation processes. And the corrosion mechanism is also discussed.

Keywords: Ferritic steel, Corrosion mechanism, Electrochemical, Molten (Li,Na,K)F.

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