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Corrosion Behaviour of Ferreous Alloys in Flowing LiPb

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Liquid metal LiPb blanket design is one of the most promising designs for fusion power reactors and under wide research in the world. The compatibility of fusion structure materials with LiPb becomes one of the key issues in LiPb Blankets. Therefore, LiPb loop is considered as one of the most important experimental facilities used to study these key issues in advance. Two thermal convection LiPb loops have been set up in ASIPP (Institute of Plasma Physics, Chinese Academy of Science), China. The first one, named DRAGON-I, was built in 2005, the temperature of its test section is 480°C in order to obtain the flowing LiPb environment for the corrosion experiment of RAFM (Reduced Activation Ferretic Martensitic) steel and others materials with LiPb under the temperature difference of 60°C. The corrosion experiment of ferreous alloys such as Inconel 600, 316L and CLAM (Chinese Low Activation Martensitic) in flowing LiPb in DRAGON-I loop lasting for 500 and 1000 hours are presented in the paper. The features of corrosion layers for each specimen are analyzed by SEM and EDX, respectively, and their corrosion rates are achieved, too. The comparison of those corrosion behaviours reveals preliminarily that the presence of chromium decreases the nickel dissolution and resists the corrosion rate of those materials.

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