

## **Corrosion of Refractory Metals and Advanced Steels in 700°C Stagnant and 250 °C Flowing Lead-Bismuth Eutectic**

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Lead and lead bismuth eutectic (LBE) are extremely corrosive at elevated temperatures (500-700°C) to conventional steels used in reactors. Flowing LBE introduces more challenges in terms of mechanical, thermal-hydraulics, and corrosion. To address these challenges, a high temperature corrosion test station was built at Niowave to test a variety of sample coupons up to 700 °C LBE for 1 week. Several refractory materials and advanced alloys were tested and this presentation will address the evaluation of corrosion behavior of those samples.

Three one-week stagnant corrosion experiments were performed in 700 °C, oxygen saturated LBE. Exposed samples included bare and masked (using TiN) molybdenum, TZM, and tantalum, and niobium. Additionally a bare functionally graded composite (F91 / Fe-12Cr-2Si) and MA 956 coupons were exposed. A 1000 hour, 250°C, 3.8 m/s flowing LBE corrosion experiment was performed on molybdenum, tantalum, and 304L stainless steel. Characterization techniques used include SEM and TEM to investigate surface layers, EDS line scans to characterize oxide composition, and weight gain/loss measurements.