

## Corrosion Investigation of Superalloys, Molybdenum and TZM in Chloride Molten Salts

**Authors :** Craig Jantzen, Tim Abram, Dirk Engelberg, Hugues Lambert, Daniel Cooper

**Abstract :** Molten salts are of high interest for use as coolants in nuclear reactors due to favourable high temperature and thermodynamic properties. The corrosive behaviour of molten salts however pose a materials integrity challenge. Three Ni / Ni-Fe based and two Mo based alloys have been exposed to molten eutectics (LiCl-KCl at 59.5:40.5 mol% and KCl-MgCl<sub>2</sub> at 68:32 mol%) at 600°C and 800°C for durations up to 500hrs. Corrosion was observed to preferentially attack alloy constituents in order of their reactivity, with chromium the most vulnerable and depleted element. Alloy weight-loss per unit area was calculated to give linear corrosion rates, discounting any initial rapid corrosion of impurities. Further analysis was carried out using ICP-MS, SEM and EDX techniques to give a more detailed view of the corrosion mechanisms.

**Keywords :** molten salt, salt, corrosion, high temperature, licl, KCL, MgCl, molybdenum, nickel, superalloys

**Conference Title :** ICNMNF 2017 : International Conference on Nuclear Materials and Nuclear Fuels

**Conference Location :** Rome, Italy

**Conference Dates :** March 05-06, 2017