EFFECT OF MAGNETIC FIELD ON THE CORROSION BEHAVIOR OF INDIAN RAFMS IN LIQUID Pb-Li

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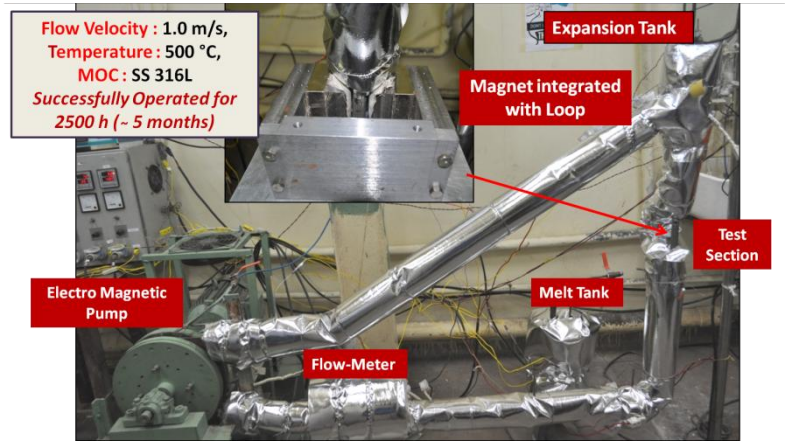
P. Chakraborty [a,], V. Singh [a], P. Trivedi [b], S. Malhotra [b], K. Singh [a], V. Kain [c] and R. Tewari [a]*

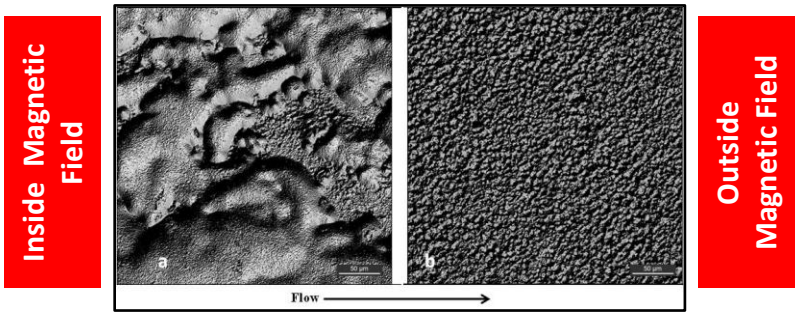
[a] Material Science Division, [b] Accelerator Control Division, [c] Materials Processing and Corrosion Engineering Division, Bhabha Atomic Research Centre, Mumbai 400085, India

**poulamic@barc.gov.in*

- *A forced circulation Pb-Li loop named EMPPIL-M was installed at BARC and a permanent magnet (5 T) was integrated the loop in order to study the effect of magnetic field on the corrosion of these materials in Pb-Li and also understand the underlying corrosion mechanism.*
- *Samples of Indian Reduced Activation Ferritic Martensitic Steel (IN RAFMS) were exposed in Pb-Li in this loop, flowing transverse to the magnetic field and at a temperature of 773 K.*



Actual Photograph of EMPPIL-M with integrated magnet.



Optical image (20 x) of IN RAFMS exposed to Pb-Li at 773 K

- ***The corrosion rate of IN RAFMS in the Pb-Li eutectic is found to be 1.3 times higher in the presence of the magnetic field of 0.5 T.***

Conclusions:-

1. *Higher corrosion rate of IN RAFMS magnetic field was associated with increase in local Pb-Li flow velocities due to MHD effect.*
2. *The sample surface inside the magnetic field showed non uniform corrosion along with the formation of distinct regions having different surface morphology.*
3. *Pb-Li attack in the presence of magnetic field was not only confined to the prior austenite and lath boundaries but also took place in the intra-lath regions*
4. *Dissolution of iron from IN RAFMS into Pb-Li was found to much higher in the presence of magnetic field probably due to its ferromagnetic characteristics.*