Workshop on Tritium Control and Capture in Salt Cooled Fission and Fusion Reactors

Salt Lake City
10.27.2015 & 10.28.2015

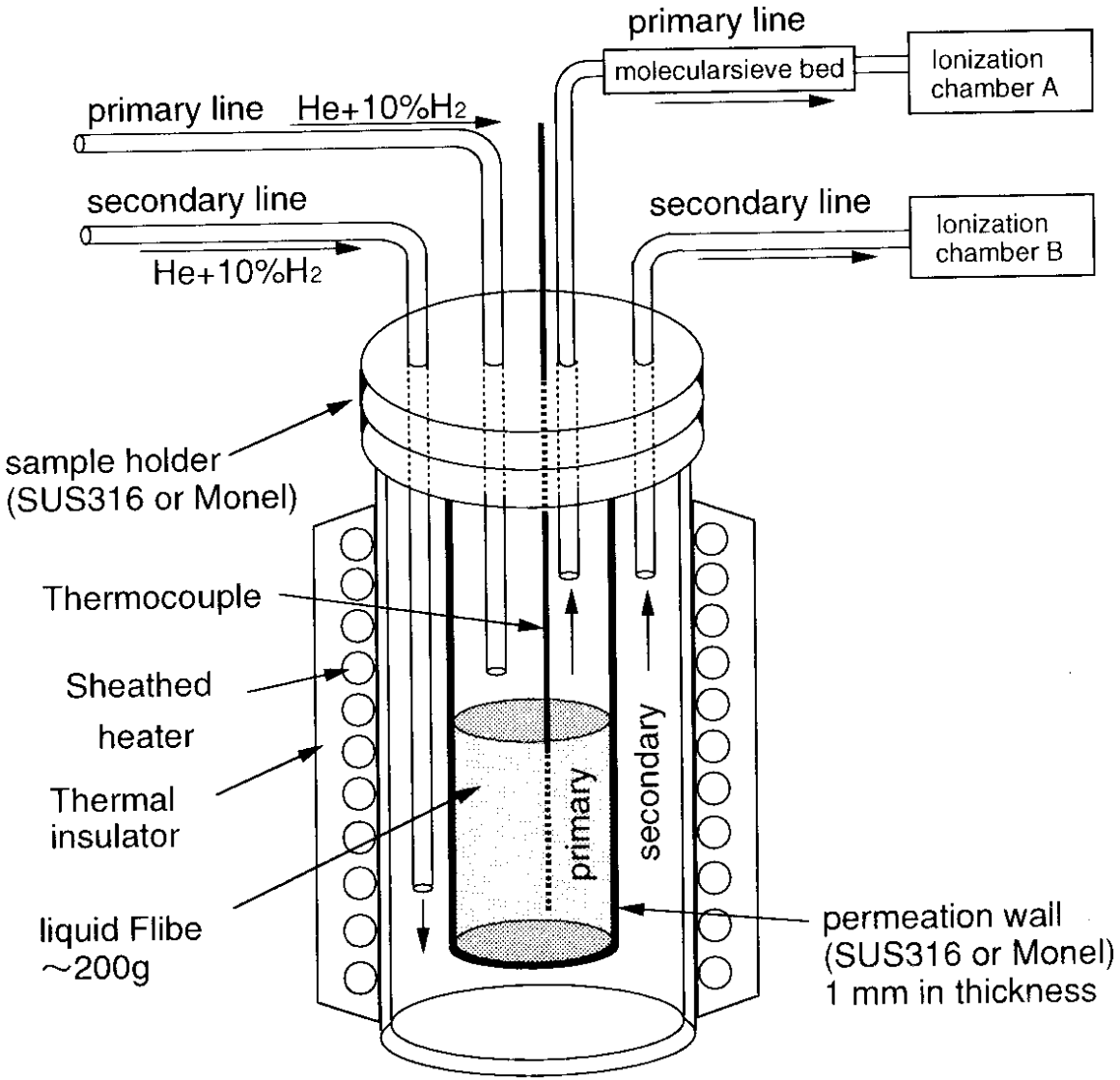
The Effect of Hydrogen on Tritium Control in Molten Salt System

Huali Wu, Raluca O Scarlat
Nuclear Engineering
University of Wisconsin Madison

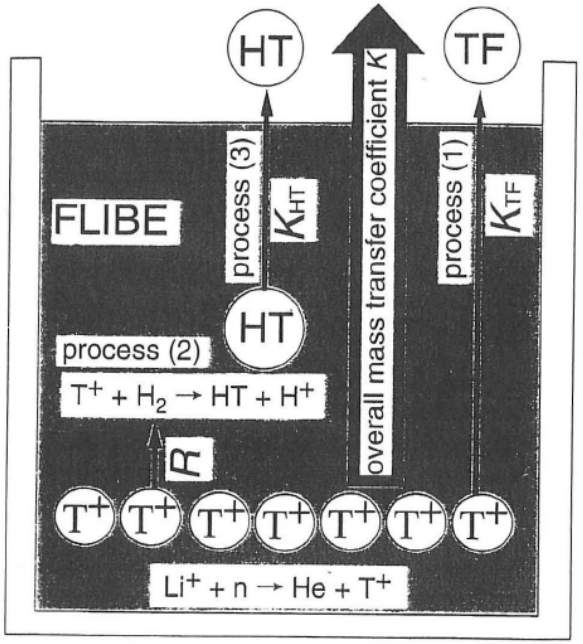
huali@wisc.edu
HEATandMASS.ep.wisc.edu

DEPARTMENT OF
Engineering Physics
UNIVERSITY OF WISCONSIN–MADISON

Tritium Chemical Form with He/H_2 Sparging



Chemical Form of Released Tritium with He/H_2 Sparging



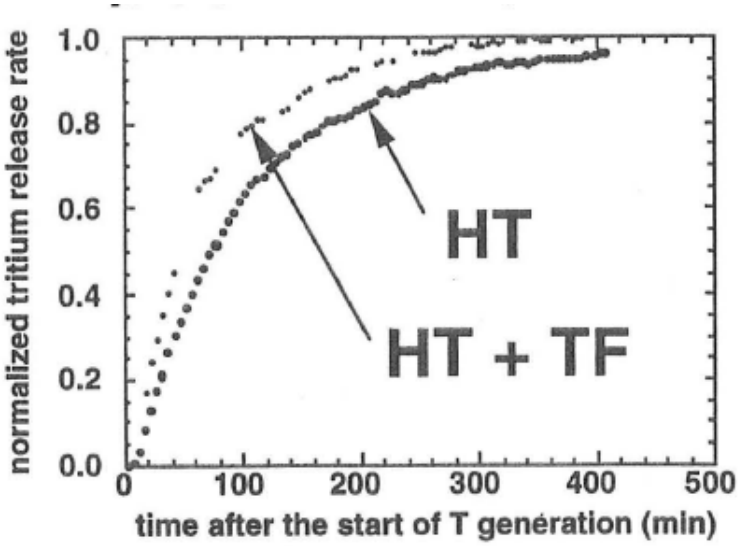


Fig.4(a) Tritium chemical form at 873K with H_2 purge gas.

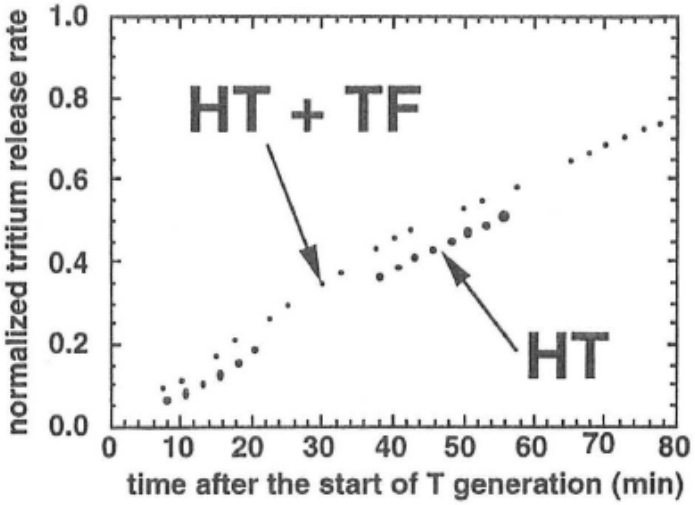


Fig.4(b) Tritium chemical form at 873K with He+1%H_2 purge gas.

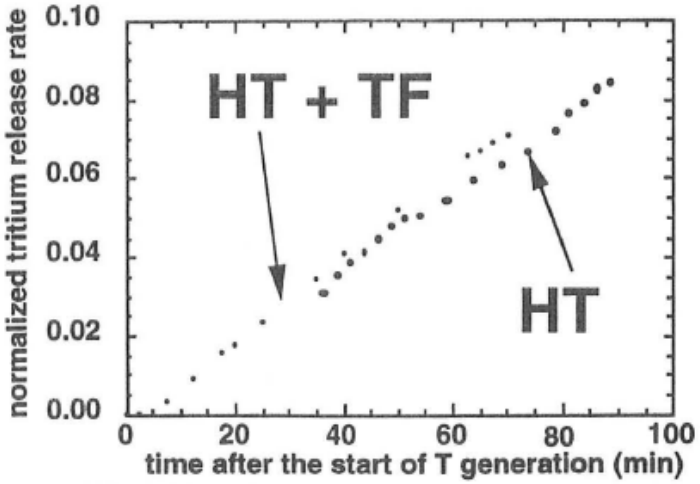


Fig.4(d) Tritium chemical form at 873K after long-time (24-26 days) dehumidification with He purge gas.

Permeation of Tritium through Structural Wall

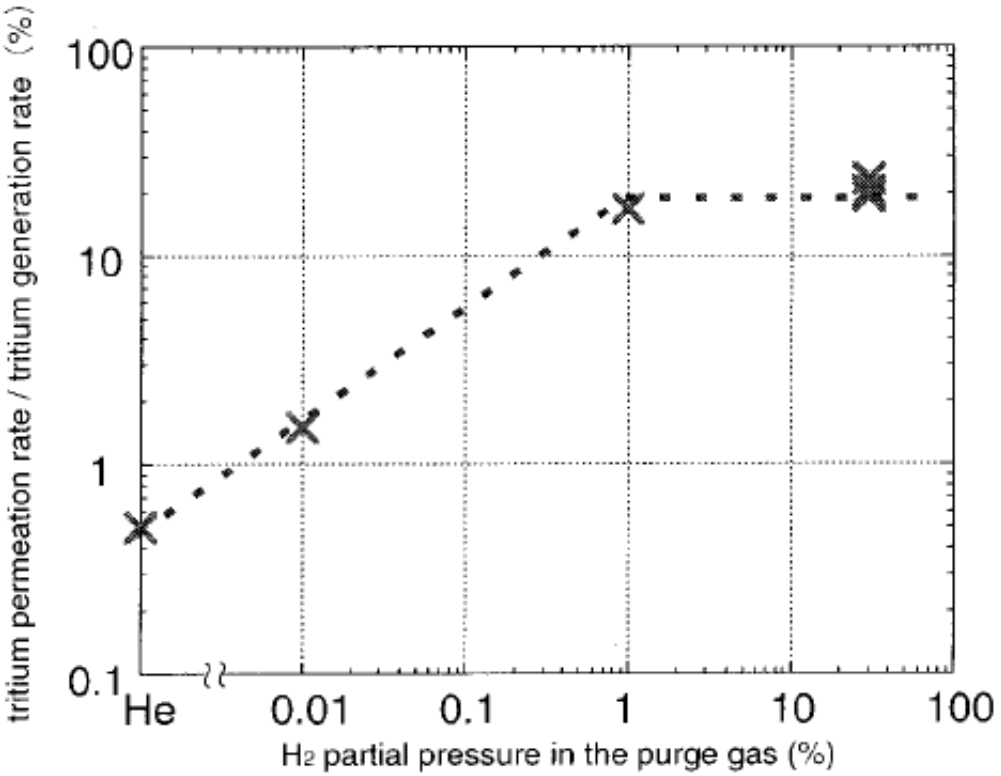


Fig. 3. The ratio of tritium permeation rate to tritium generation rate at steady state.

1. Would it be useful in the FHR system to sparge with He/H2, for tritium control?
2. How does the diffusion coefficient differ between TF and HT? Is it important to differentiate between the two?

H_2 Treatment of Graphite

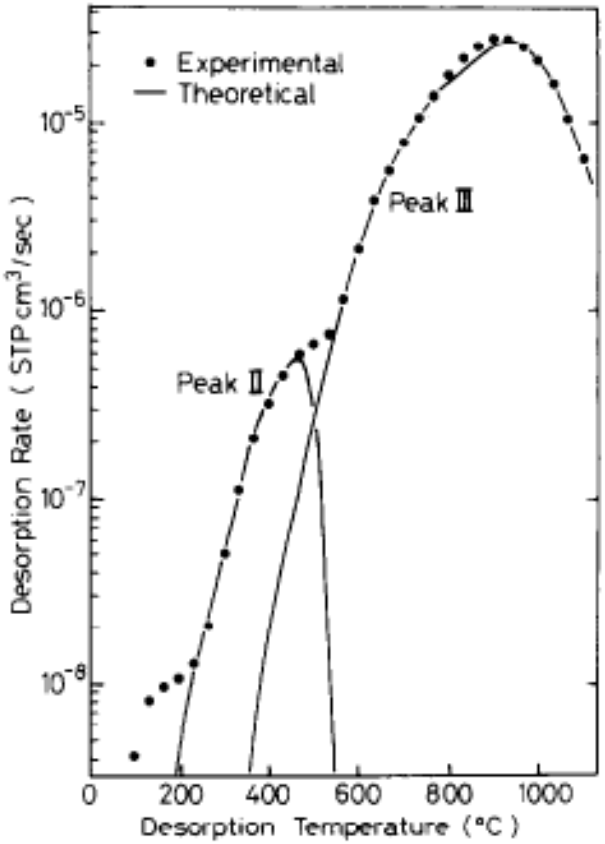
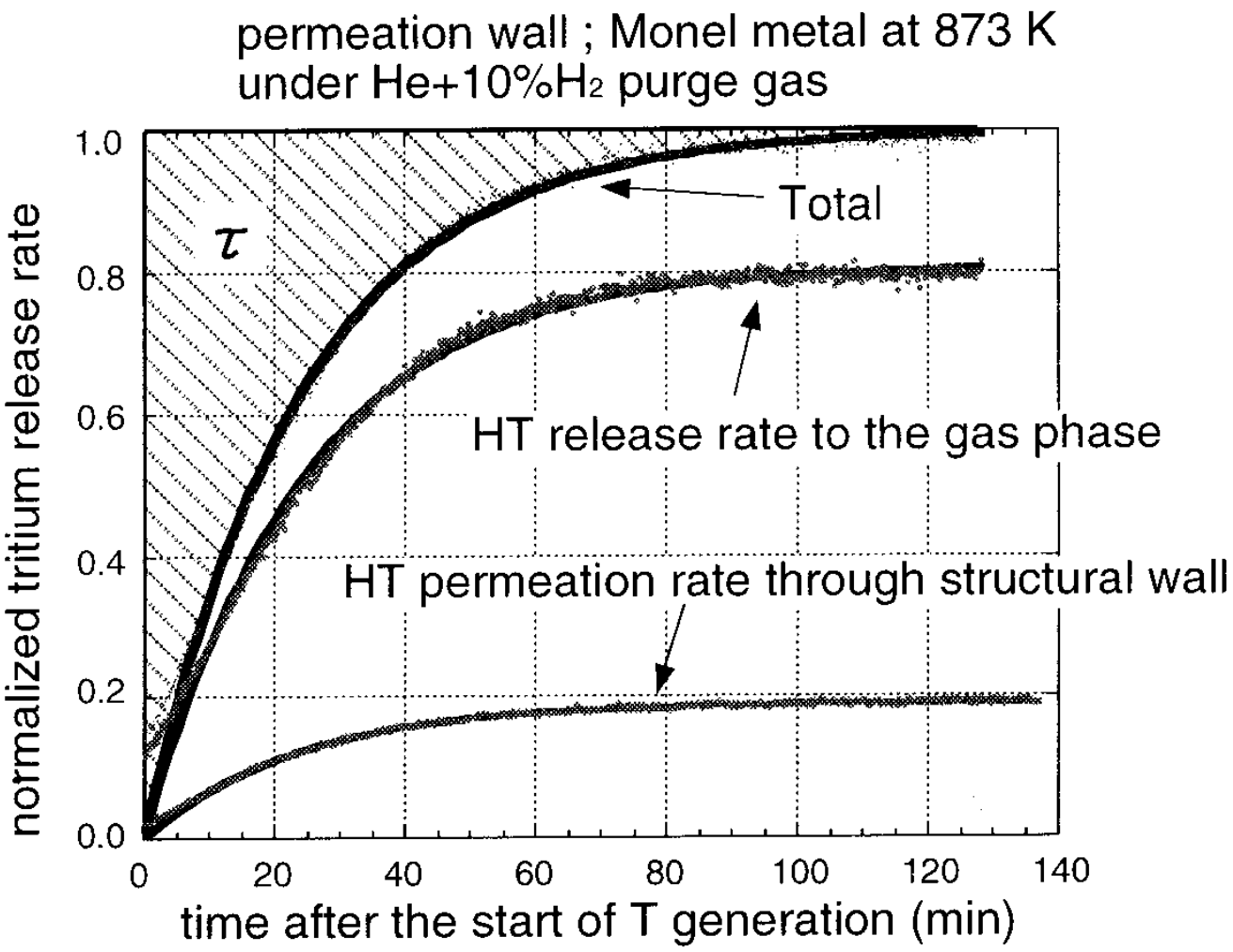


Fig. 6. Thermal desorption curve derived from diffusion analysis.

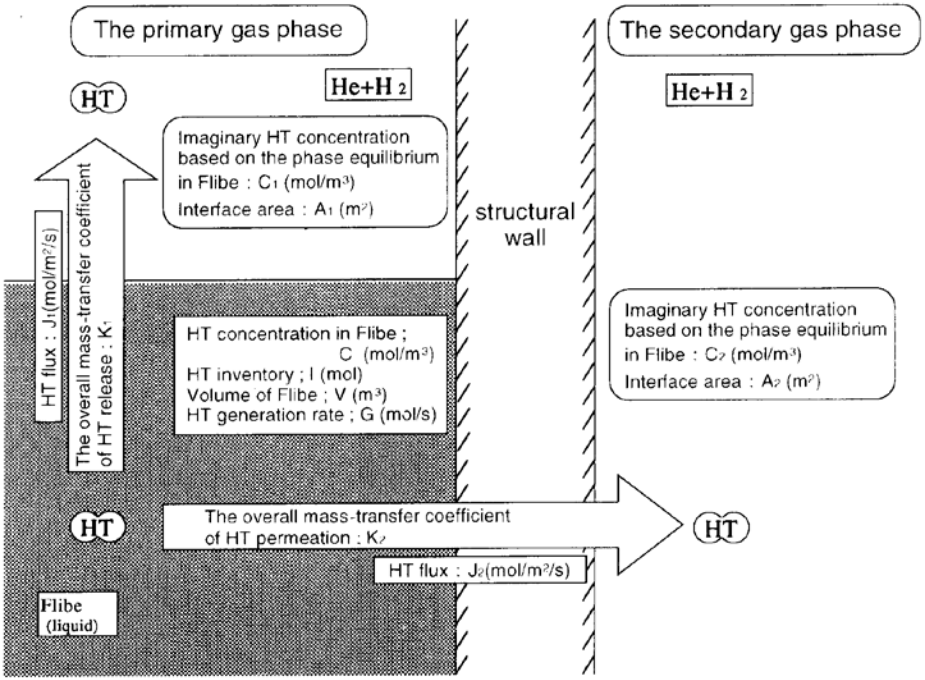
1. Would the fuel element be H2 treated to remove oxides before introducing in the salt?

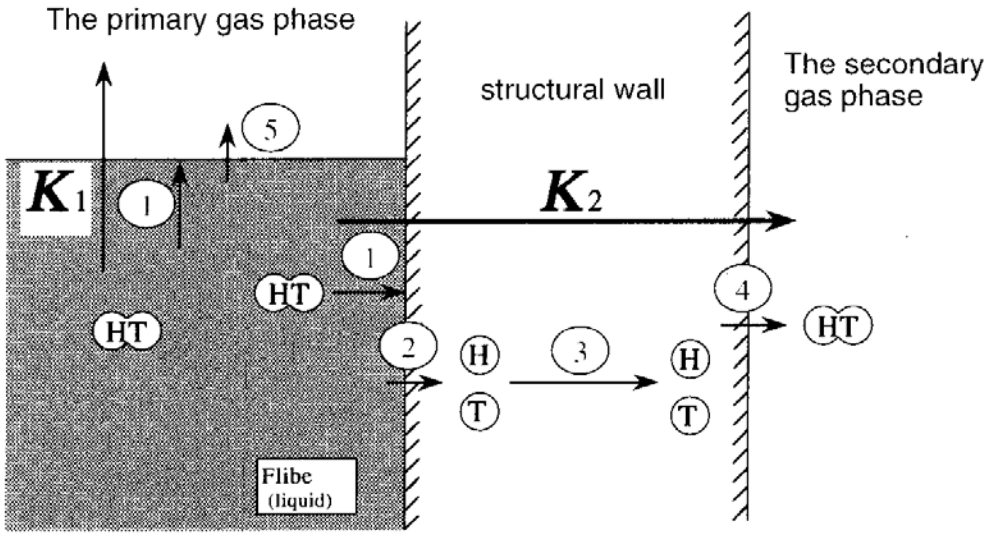
References and Figure Sources

Backup Slides



Backup Slides – HT release and HT permeation





Mechanism of Tritium Release From Flibe