

# Other FW and Blanket Coating Issues

R.F. Mattas

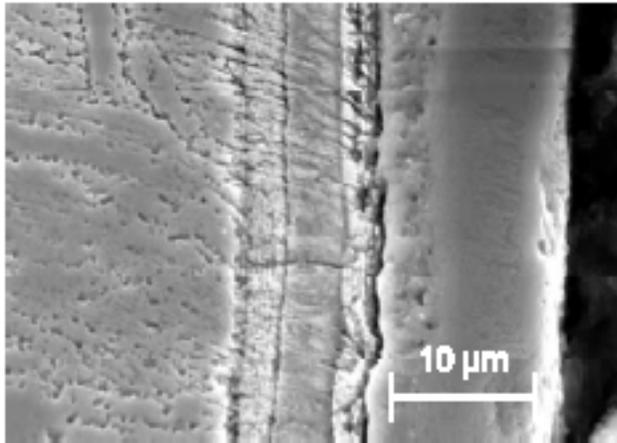
Argonne National Laboratory

Presented at Materials Sciences Program Strategic  
Planning Meeting, UCSB, August 26-29, 2002

# Coating Types

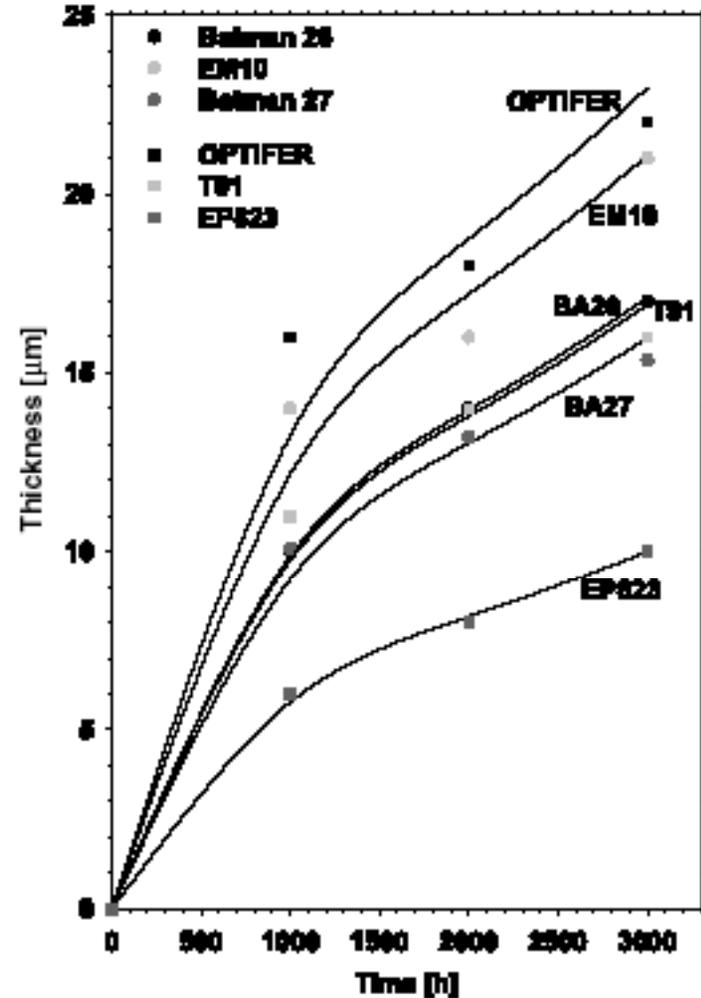
- MHD pressure reduction
- Corrosion barrier
- Permeation barrier
  - Intentional
  - Unintentional
- Coolant containment
  - SiC/SiC
- Plasma performance
  - W on FW

# Corrosion - Ferritic Steel and Pb



SEM micrograph, etched cross-section of F82H tested in Pb-55.5Bi at 749 K for 700 h.

C. Fazio, G. Benamati, C. Martini, and G. Palombarini, J. Nucl. Mater., 296 (2001) 243-248



Oxidation kinetics of the martensitic steels tested at 743 K. The measured oxide layer thicknesses are reported vs. the testing time and interpolated with a parabolic equation.

F. Barbier, G. Benamati, C. Fazio, A. Rusanov, J. Nucl. Mater., 295 (2001) 149-156

# Common Features

- More interfaces
- Coatings change system chemistry considerations
- Typically coatings are more fragile than structures
  - May reduce lifetime/performance limits of components
- Coatings requirements could alter properties/response of structure

# Observations/Suggestions

- Coatings will likely be part of most FW/B designs and need to be included in materials planning/modeling/experiments.
- Because coatings can connect coolant, structure, breeder, and multiplier considerations, it becomes more difficult to treat each separately.
- Coating requirements may limit material options.
- Coatings are generally much more complex than a monolithic layer on a substrate, and understanding behavior is difficult.