NE 795 Advanced Reactor Materials and Materials Performance

Exam 3

The associated point values provide an indication of the expected thoroughness of response.

1. What are the types and benefits of molten salt reactors? (7pts)
2. What are three key properties needed for molten salt fuel and why are they important? (7pts)
3. What role does the cover/sparge gas serve in MSRE type reactors? (7pts)
4. Discuss corrosion of the cladding in a molten salt environment. (14pts)
5. Why are we interested in carbide and nitride fuels? (8pts)
6. What are the two types of pin designs for C and N fuels? Discuss design and operational ramifications of the designs. (12pts)
7. What are the three stages of temperature evolution in C and N fuels? (6pts)
8. How do carbides and nitrides restructure as a function of burnup? (8pts)
9. Discuss FCCI for carbide fuels. (8pts)
10. Why is fabrication of carbides and nitrides difficult? Why is nitride fuel fabrication more expensive than carbides? (8pts)
11. How do the C/M and N/M ratios change with burnup? Why is this important? (9pts)
12. Why are lead-based coolants of interest? What is an area of concern for them? (6pts)