NE 795-010 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 three categorizations of salt reactors? (6pts)
2. What are two distinct benefits of molten salt reactors? (5pts)
3. What are three key properties needed for molten salt fuel? (6pts)
4. Discuss corrosion of the cladding in a molten salt environment, including the role of oxygen impurities, protective coatings, redox potential, etc. (14pts)
5. What is the purpose of the cover gas in MSRE type reactors? (5pts)
6. Why are Ni-based alloys of primary interest in MSRs? (6pts)
7. Why are we interested in carbide and nitride fuels? (6pts)
8. What are the two types of pin designs for C and N fuels? Discuss design and operational ramifications of the designs. (14pts)
9. What are the three stages of temperature evolution in C and N fuels? (6pts)
10. How do carbides and nitrides restructure as a function of burnup? (8pts)
11. Discuss FCMI and FCCI for carbide fuels. (8pts)
12. Why is fabrication of carbides and nitrides difficult? Why is nitride fuel fabrication more expensive than carbides? (8pts)
13. How do the C/M and N/M ratios change with burnup? Why is this important? (8pts)