Fuel Performance

1. Fuel basics (F1, F2, M9)
   1. Purpose of the fuel
   2. What atoms fission
   3. Types of fuel
   4. Products of fission
   5. Energy released by fission
   6. Heat generation rate for different fuel types
   7. Role of cladding
   8. Fuel fabrication
2. Heat transport (M9, O10)
   1. Summary
   2. Equation and analytical solutions
   3. Numerical solutions
   4. Connection between coolant temperature and power generation
   5. Connection between coolant temperature and max temperature/melting for different fuel types
3. Mechanics (M6)
   1. Mechanics review
   2. Thermomechanical behavior
   3. Equation and solutions
   4. Solution methods for existing fuel performance codes
   5. Summary of US fuel performance codes
4. Materials issues in the fuel
   1. Chemistry
   2. Fission products
   3. Fission gas
   4. Swelling
   5. Creep
   6. Grain growth
   7. HBS
   8. Fracture
   9. Thermal conductivity
   10. Fracture strength
   11. Elasticity tensor
   12. Volume change
5. Materials issues in the cladding
   1. Growth
   2. Creep
   3. Irradiation hardening
   4. Oxidation
   5. Hydride formation
   6. Stress corrosion cracking
6. Accident, used fuel disposition, and fuel cycle (M9)
   1. Loca
   2. Ria
   3. UFD
   4. Recycling fuel
   5. Fast reactors
   6. Why we don’t do it