Chemistry 106 Objectives Chapter 19, Nuclear Chemistry

Terms:

radioactivity
radioactive decay
daughter nucleus
parent nucleus
alpha particle
beta particle
gamma ray
positron
fission
fusion
mass defect
nuclear binding energy
chain reaction
critical mass
half life
k-electron capture

You should be able to:

1. list the factors that affect nuclear stability,
2. indicate the symbols, mass number, and charge for all the different types of radiation,
3. complete and balance nuclear reaction equations,
4. explain what affect beta emission, positron emission, and K-electron capture have on the nucleus,
5. calculate the rate (decay) constant for a radioactive isotope,
6. calculate the amount of radioactive material left after a certain amount of time, given the starting amount of material and the half life,
7. indicate the isotope used to determine the age of organic material,
8. calculate the age of an artifact given the necessary data,
9. explain the significance of $E=mc^2$
10. calculate energy changes involved in nuclear reactions,
11. calculate binding energy and binding energy per nucleon and explain the significance of the binding energy per nucleon,
12. describe what is needed to get heavy nuclei to undergo fission in a nuclear reactor,
13. explain why fission of heavy nuclei and fusion of light nuclei are exothermic processes,
14. draw and label a schematic diagram of a nuclear power plant and describe the process by which a nuclear reactor works,
15. indicate the fuel most commonly used in nuclear power plants.