0.0.0.1 Given an alpha of known energy

0.0.0.1.1 Calculate the max energy transferred to carbon and tungsten.

$$M_1 = 4$$

$$M_2 = 184 \, or \, 12$$

$$T_2^{max} = \frac{4M_1M_2}{(M_1+M_2)^2}T_0$$

0.0.0.1.2 calculate the average number of displacements created by each.

0.0.0.1.3 Calculate the ratio $\frac{T_{max,carbon}}{T_{max,tungsten}}$.

0.0.0.2 Given a known thermal neutron flux in a reactor ($10^{22} \, n/cm^2 \cdot s$).

0.0.0.2.1 Calculate the rate of (n,γ) reactions in iron given capture cross section.

0.0.0.2.2 If the gamma release is $10 \, MeV$ calculate the energy of the recoil iron ion.

0.0.0.2.3 Calculate dpa/sec from iron recoils.

0.0.0.2.4 For a $0.5 \, MeV$ neutron flux given above, given elastic scatter cross section, calculate dpa/sec from neutron scattering.

0.0.0.3 Sputtering give

0.0.0.3.1 Relationship of yield at $t = 0$ and $t = \infty$.

$$\frac{Y_A(0)}{Y_A(0)} = r\frac{N_A^b}{N_B^b}$$

$$\frac{Y_A(\infty)}{Y_B(\infty)} = \frac{N_A^b}{N_B^b}$$

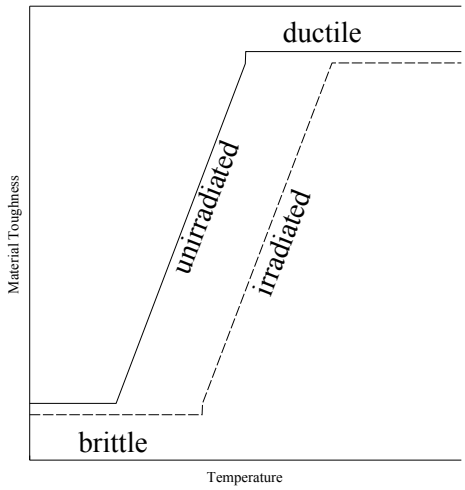

Figure 1: Transition from Brittle to Ductile and Irradiations Effect

0.0.0.3.2 Given $\frac{N_A^s(\infty)}{N_B^s(\infty)}$ find $\frac{N_A^b}{N_B^b}$.

$$\frac{N_A^s(\infty)}{N_B^s(\infty)} = \frac{N_B^b}{N_B^b}$$

0.0.0.3.3 Calculate $\frac{Y_A(\infty)}{Y_B(\infty)}$.

$$\frac{Y_A(\infty)}{Y_B(\infty)} = \frac{N_A^b}{N_B^b}$$

0.0.0.4 DBTT

0.0.0.4.1 Define DBTT The ductile to brittle transition temperature. And Charpy Test (hammer dropped, height before and after analyzed).

0.0.0.4.2 How do you measure DBTT? Plot below showing the extension of the DBTT temperature after irradiation and unirradiated.

0.0.0.4.3 Radiation effect on DBTT and why it is important?

0.0.0.4.4 How do you counteract embrittlement?

0.0.0.5 Swelling and Creep

0.0.0.5.1 Name several differences between swelling and creep.

0.0.0.5.2 What is the temperature effect on swelling and creep?

0.0.0.5.3 Why are swelling and creep a concern?