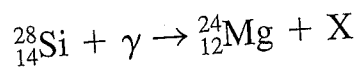


43.20. The isotope ^{90}Sr undergoes β^- decay with a half-life of 28 years. (a) What nucleus is produced by this decay? (b) If a nuclear power plant is contaminated with ^{90}Sr , how long will it take for the radiation level to decrease to 1.0% of its initial value?

43.46. Consider the nuclear reaction



where X is a nuclide. (a) What are Z and A for the nuclide X? (b) Ignoring the effects of recoil, what minimum energy must the photon have for this reaction to occur? The mass of a $^{28}_{14}\text{Si}$ atom is 27.976927 u, and the mass of a $^{24}_{12}\text{Mg}$ atom is 23.985042 u.

43.54. Thorium $^{230}_{90}\text{Th}$ decays to radium $^{226}_{88}\text{Ra}$ by α emission. The masses of the neutral atoms are 230.033127 u for $^{230}_{90}\text{Th}$ and 226.025403 u for $^{226}_{88}\text{Ra}$. If the parent thorium nucleus is at rest, what is the kinetic energy of the emitted α particle? (Be sure to account for the recoil of the daughter nucleus.)