

(16.3) Irradiation of  $^{238}\text{U}$  with deuterium yields  $^{238}\text{Pu}$ . Will any other plutonium isotope be produced?

Main reaction:  $^{238}\text{U}(\text{d},2\text{n})^{238}\text{Np}(\beta^-)^{238}\text{Pu}$

Competing reactions:

(1)  $^{238}\text{U}(\text{d},\text{n})^{239}\text{Np}(\beta^-)^{239}\text{Pu}$

(2)  $^{238}\text{U}(\text{d},\text{p})^{239}\text{U}(\beta^-)^{239}\text{Np}(\beta^-)^{239}\text{Pu}$

Answer: Yes;  $^{239}\text{Pu}$  will also be produced.