

Use with textbook pages 286–299.

Radioactive decay and nuclear equations

Remember the following two rules when working with nuclear equations:

- I. The sum of the mass numbers does not change.
- II. The sum of the charges in the nucleus does not change.

Identify each nuclear equation as alpha decay, beta decay, or gamma decay, and then complete the nuclear equation.

1. ${}_{15}^{32}\text{P} \rightarrow {}_{16}^{32}\text{S} + {}_{-1}^0\beta$ Beta
2. ${}_{84}^{218}\text{Po} \rightarrow {}_{82}^{214}\text{Pb} + {}_2^4\text{He}$ Alpha
3. ~~${}_{4}^{18}\text{Y} \rightarrow {}_5^{18}\text{Ar} + {}_{-1}^0e$ Beta~~
4. ${}_{12}^{24}\text{Mg}^* \rightarrow {}_{12}^{24}\text{Mg} + {}_0^0\gamma$ Gamma
5. ${}_{91}^{234}\text{Pa} \rightarrow {}_{89}^{230}\text{Ac} + {}_2^4\alpha$ Alpha
6. ${}_{58}^{141}\text{Ce} \rightarrow {}_{59}^{141}\text{Pr} + {}_{-1}^0e$ Beta
7. ${}_{84}^{216}\text{Po} \rightarrow {}_{85}^{216}\text{At} + {}_{-1}^0\beta$ Beta
8. ${}_{9}^{20}\text{F} \rightarrow {}_{10}^{20}\text{Ne} + {}_{-1}^0\beta$ Beta
9. ${}_{26}^{58}\text{Fe}^* \rightarrow {}_{26}^{58}\text{Fe} + {}_0^0\gamma$ Gamma
10. ${}_{89}^{235}\text{Ac} \rightarrow {}_{87}^{221}\text{Fr} + {}_2^4\alpha$ Alpha
11. ${}_{64}^{149}\text{Gd}^* \rightarrow {}_{64}^{149}\text{Gd} + {}_0^0\gamma$ Gamma
12. ${}_{88}^{226}\text{Ra} \rightarrow {}_{86}^{222}\text{Rn} + {}_2^4\alpha$ Alpha
13. ${}_{81}^{212}\text{Tl} \rightarrow {}_{82}^{212}\text{Pb} + {}_{-1}^0\beta$ Beta
14. ${}_{83}^{214}\text{Bi} \rightarrow {}_{81}^{210}\text{Tl} + {}_2^4\alpha$ Alpha
15. ${}_{98}^{254}\text{Cf}^* \rightarrow {}_{98}^{254}\text{Cf} + {}_0^0\gamma$ Gamma