

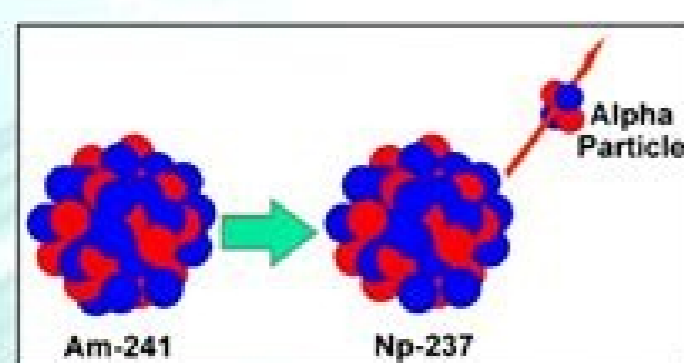
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# Unit 11: Nuclear Chemistry

## Topic 1: Natural Radioactivity

**Objective:** Identify the 4 modes of decay, use Table N and O to identify natural radioactive decay and write nuclear equations, identify the similarities and differences between physical, chemical, and nuclear reactions, identify what transmutation is



### Balancing Chemical Equations Worksheet

- $2 \text{H}_2 + \text{O}_2 \rightarrow 2 \text{H}_2\text{O}$
- $\text{N}_2 + 3 \text{H}_2 \rightarrow 2 \text{NH}_3$
- $\text{S}_8 + 12 \text{O}_2 \rightarrow 8 \text{SO}_2$
- $2 \text{N}_2 + \text{O}_2 \rightarrow 2 \text{N}_2\text{O}$
- $2 \text{HgO} \rightarrow 2 \text{Hg} + \text{O}_2$
- $6 \text{CO}_2 + 6 \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$
- $\text{Zn} + 2 \text{HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2$
- $\text{SiCl}_4 + 2 \text{H}_2\text{O} \rightarrow \text{H}_4\text{SiO}_4 + 4 \text{HCl}$
- $2 \text{Na} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOH} + \text{H}_2$
- $2 \text{H}_3\text{PO}_4 \rightarrow \text{H}_4\text{P}_2\text{O}_7 + \text{H}_2\text{O}$
- $\text{C}_2\text{H}_6 + 7 \text{Cl}_2 \rightarrow 2 \text{C} + 12 \text{HCl}$
- $\text{CO}_2 + 2 \text{NH}_3 \rightarrow \text{OC}(\text{NH}_2)_2 + \text{H}_2\text{O}$
- $3 \text{Si}_2\text{H}_6 + 10 \text{O}_2 \rightarrow 6 \text{SiO}_2 + 6 \text{H}_2\text{O}$
- $2 \text{Al}(\text{OH})_3 + 3 \text{H}_2\text{SO}_4 \rightarrow \text{Al}_2(\text{SO}_4)_3 + 6 \text{H}_2\text{O}$
- $4 \text{Fe} + 3 \text{O}_2 \rightarrow 2 \text{Fe}_2\text{O}_3$
- $\text{Fe}_2(\text{SO}_4)_3 + 6 \text{KOH} \rightarrow 2 \text{K}_2\text{SO}_4 + 2 \text{Fe}(\text{OH})_3$
- $2 \text{C}_2\text{H}_2 + 5 \text{O}_2 \rightarrow 4 \text{CO}_2 + 2 \text{H}_2\text{O}$
- $\text{H}_2\text{SO}_4 + 2 \text{HI} \rightarrow \text{H}_2\text{S} + \text{I}_2 + 2 \text{H}_2\text{O}$
- $2 \text{FeS}_2 + 11 \text{O}_2 \rightarrow \text{Fe}_2\text{O}_3 + 4 \text{SO}_2$
- $2 \text{Al} + 3 \text{FeO} \rightarrow \text{Al}_2\text{O}_3 + 3 \text{Fe}$
- $\text{Fe}_2\text{O}_3 + 3 \text{H}_2 \rightarrow 2 \text{Fe} + 3 \text{H}_2\text{O}$
- $\text{Na}_2\text{CO}_3 + 2 \text{HCl} \rightarrow 2 \text{NaCl} + \text{H}_2\text{O} + \text{CO}_2$
- $2 \text{K} + \text{Br}_2 \rightarrow 2 \text{KBr}$
- $\text{C}_2\text{H}_6 + 7 \text{O}_2 \rightarrow 2 \text{CO}_2 + 6 \text{H}_2\text{O}$
- $\text{P}_4 + 5 \text{O}_2 \rightarrow 2 \text{P}_2\text{O}_5$

Name: \_\_\_\_\_ Date: \_\_\_\_\_

### Balancing Chemical Equations

Balance the following chemical equations.

- \_\_\_ KOH + \_\_\_ H<sub>3</sub>PO<sub>4</sub> → \_\_\_ K<sub>3</sub>PO<sub>4</sub> + \_\_\_ H<sub>2</sub>O
- \_\_\_ NH<sub>3</sub> + \_\_\_ O<sub>2</sub> → \_\_\_ NO + \_\_\_ H<sub>2</sub>O
- \_\_\_ Al + \_\_\_ O<sub>2</sub> → \_\_\_ Al<sub>2</sub>O<sub>3</sub>
- \_\_\_ CaS + \_\_\_ H<sub>2</sub>O → \_\_\_ Ca(HS)<sub>2</sub> + \_\_\_ Ca(OH)<sub>2</sub>
- \_\_\_ Au<sub>2</sub>S<sub>3</sub> + \_\_\_ H<sub>2</sub> → \_\_\_ Au + \_\_\_ H<sub>2</sub>S
- \_\_\_ PCl<sub>5</sub> + \_\_\_ H<sub>2</sub>O → \_\_\_ H<sub>3</sub>PO<sub>4</sub> + \_\_\_ HCl
- \_\_\_ Ba<sub>3</sub>N<sub>2</sub> + \_\_\_ HF → \_\_\_ BaF<sub>2</sub> + \_\_\_ NH<sub>3</sub>
- \_\_\_ CaCl<sub>2</sub> + \_\_\_ Na<sub>3</sub>PO<sub>4</sub> → \_\_\_ Ca<sub>3</sub>(PO<sub>4</sub>)<sub>2</sub> + \_\_\_ NaCl
- \_\_\_ FeS + \_\_\_ O<sub>2</sub> → \_\_\_ Fe<sub>2</sub>O<sub>3</sub> + \_\_\_ SO<sub>2</sub>
- \_\_\_ HClO<sub>4</sub> + \_\_\_ P<sub>4</sub>O<sub>10</sub> → \_\_\_ H<sub>3</sub>PO<sub>4</sub> + \_\_\_ Cl<sub>2</sub>O<sub>7</sub>



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