

Chemistry 20 – Lesson 4
Balancing chemical equations

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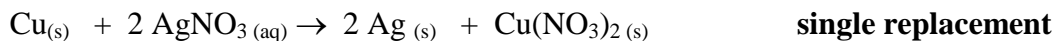
I. Practice problems

	Reaction Type
1. $4 \text{Al}_{(s)} + 3 \text{O}_{2(g)} \rightarrow 2 \text{Al}_2\text{O}_{3(s)}$	formation
2. $2 \text{HCl}_{(aq)} + \text{Ca}(\text{OH})_{2(aq)} \rightarrow 2 \text{HOH}_{(l)} + \text{CaCl}_{2(aq)}$	double replacement
3. $\text{CH}_4(g) + 2 \text{O}_2(g) \rightarrow \text{CO}_2(g) + 2 \text{H}_2\text{O}(g)$	complete combustion
4. $\text{Zn}_{(s)} + \text{Pb}(\text{CH}_3\text{COO})_{2(aq)} \rightarrow \text{Pb}_{(s)} + \text{Zn}(\text{CH}_3\text{COO})_{2(aq)}$	single replacement
5. $\text{SO}_3(g) + \text{H}_2\text{O}(l) \rightarrow \text{H}_2\text{SO}_4(aq)$	formation
6. $2 \text{HgO}_{(s)} \rightarrow 2 \text{Hg}_{(l)} + \text{O}_{2(g)}$	decomposition
7. $\text{CaCO}_3(s) \rightarrow \text{CaO}_{(s)} + \text{CO}_2(g)$	decomposition
8. $2 \text{NaI}_{(aq)} + \text{Pb}(\text{NO}_3)_{2(aq)} \rightarrow \text{PbI}_{2(s)} + 2 \text{NaNO}_3(aq)$	double replacement
9. $\text{Cl}_{2(aq)} + 2 \text{NaI}_{(aq)} \rightarrow \text{I}_{2(aq)} + 2 \text{NaCl}_{(aq)}$	single replacement
10. $\text{Al}_2(\text{SO}_4)_{3(aq)} + 3 \text{Ca}(\text{OH})_{2(aq)} \rightarrow 2 \text{Al}(\text{OH})_{3(s)} + 3 \text{CaSO}_4(s)$	double replacement

II. Assignment

- ✓✓ 1. $\text{N}_{2(g)} + 3 \text{H}_{2(g)} \rightarrow 2 \text{NH}_{3(g)}$ **(formation)**
- ✓✓ 2. $\text{HIO}_{4(s)} + 2 \text{H}_2\text{O}_{(l)} \rightarrow \text{H}_5\text{IO}_{6(s)}$ **(formation)**
- ✓✓ 3. $2 \text{H}_2\text{S}_{(g)} + 3 \text{O}_{2(g)} \rightarrow 2 \text{SO}_{2(g)} + 2 \text{H}_2\text{O}_{(g)}$ **(complete combustion)**
- ✓✓ 4. $\text{CH}_{4(g)} + 2 \text{O}_{2(g)} \rightarrow \text{CO}_{2(g)} + 2 \text{H}_2\text{O}_{(g)}$ **(complete combustion)**
- ✓✓ 5. $\text{C}_3\text{H}_{8(g)} + 5 \text{O}_{2(g)} \rightarrow 3 \text{CO}_{2(g)} + 4 \text{H}_2\text{O}_{(g)}$ **(complete combustion)**
- ✓✓ 6. $2 \text{Al}(\text{OH})_{3(s)} + 3 \text{H}_2\text{SO}_{4(aq)} \rightarrow \text{Al}_2(\text{SO}_4)_{3(aq)} + 6 \text{HOH}_{(l)}$ **(double replacement)**
- ✓✓ 7. iron + sulfur \rightarrow iron (II) sulfide
 $8 \text{Fe}_{(s)} + \text{S}_{8(s)} \rightarrow 8 \text{FeS}_{(s)}$ **formation**
- ✓✓ 8. aluminum + fluorine \rightarrow aluminum fluoride
 $2 \text{Al}_{(s)} + 3 \text{F}_{2(g)} \rightarrow 2 \text{AlF}_{3(s)}$ **formation**

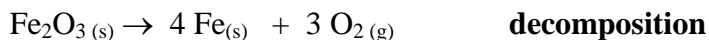
9. copper + silver nitrate → silver + copper (II) nitrate



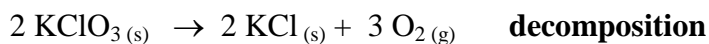
10. iron (III) chloride + sodium hydroxide → sodium chloride + iron (III) hydroxide



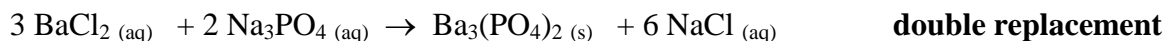
11. iron (III) oxide → iron + oxygen



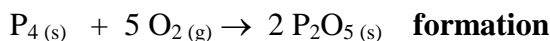
12. potassium chlorate → potassium chloride + oxygen



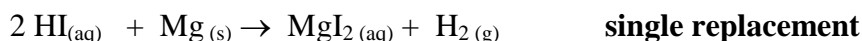
13. barium chloride + sodium phosphate → barium phosphate + sodium chloride



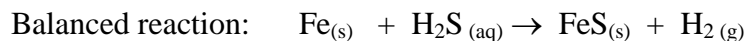
14. phosphorous + oxygen → diphosphorous pentaoxide



15. hydroiodic acid + magnesium → magnesium iodide + hydrogen

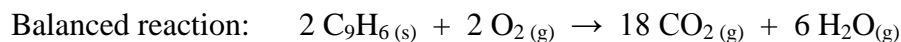


16. Iron pipes are strongly attacked and corroded by hydrosulfuric acid. (iron (II) sulfide is one product)



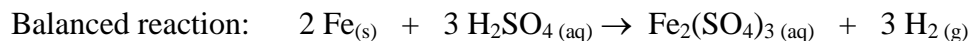
Reaction type: **single replacement**

17. Coal (C_9H_6) undergoes complete combustion.



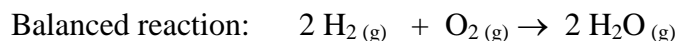
Reaction type: **complete combustion**

18. The first recorded observation of hydrogen gas was made by Paracelsus (1493-1541) when he added iron to sulfuric acid.



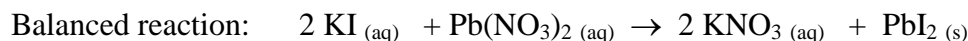
Reaction type: **single replacement**

19. When hydrogen gas and oxygen gas are mixed they form an explosive combination.



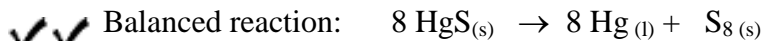
Reaction type: **formation/complete combustion**

20. A precipitate forms when potassium iodide is mixed with lead (II) nitrate.



Reaction type: **double replacement**

21. Joseph Priestly (1733-1804) decomposed cinnabar (mercury (II) sulfide).



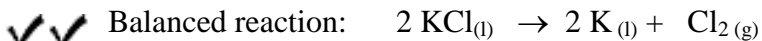
Reaction type: **decomposition**

22. A sulfurous acid solution used in the lab neutralises an ammonium hydroxide solution.



Reaction type: **double replacement**

23. Potassium metal may be obtained by decomposing molten potassium chloride.



Reaction type: **decomposition**

III. Remedial assignment – for extra practice

