Chemistry

Name _____
Practice

Balancing Equations

1. chlorine + sodium bromide ⟶ bromine + sodium chloride

2. aluminum sulfate + calcium chloride ⟶ aluminum chloride + calcium sulfate

3. sulfur + oxygen ⟶ sulfur dioxide

4. mercury(II) oxide ⟶ mercury + oxygen

5. zinc + hydrochloric acid ⟶ zinc chloride + hydrogen

6. potassium chlorate ⟶ potassium chloride + oxygen

7. copper + silver nitrate ⟶ copper(II) nitrate + silver

8. chlorine + potassium iodide ⟶ potassium chloride + iodine

9. carbonic acid ⟶ water + carbon dioxide

10. calcium + water ⟶ calcium hydroxide + hydrogen

Balancing equations:

1. $1\,C_{(s)} + 1\,O_{2(g)} \rightarrow 1\,CO_{2(g)}$

2. $1\,H_{2(g)} + 1\,Br_{2(l)} \rightarrow 2\,HBr$

3. $2\,Mg_{(s)} + 1\,O_{2(g)} \rightarrow 2\,MgO_{(s)}$

4. $2\,H_2O_{2(l)} \xrightarrow{catalyst} 2\,H_2O_{(l)} + 1\,O_{2(g)}$ ✓

5. $1\,Zn_{(s)} + 2\,AgCl \rightarrow 1\,ZnCl_2 + 2\,Ag_{(s)}$.

6. $2\,NaOH + 1\,H_2SO_4 \rightarrow 1\,Na_2SO_4 + 2\,H_2O$

7. $3\,KOH + 1\,H_3PO_4 \rightarrow 1\,K_3PO_4 + 3\,H_2O$

8. $1\,CH_4 + 4\,Br_2 \rightarrow 1\,CBr_4 + 4\,HBr$

9. $2\,KNO_3 \rightarrow 2\,KNO_2 + 1\,O_2$

10. $1\,NH_4NO_2 \rightarrow 1\,N_2 + 2\,H_2O$

11. $2\,Al + 3\,H_2SO_4 \rightarrow 1\,Al_2(SO_4)_3 + 3\,H_2$

12. $1\,CH_4 + 2\,O_2 \rightarrow 1\,CO_2 + 2\,H_2O$

13. $3\,Cu + 8\,HNO_3 \rightarrow 3\,Cu(NO_3)_2 + 2\,NO + 4\,H_2O$

14. $1\,Cl_2 + 2\,NaI \rightarrow 2\,NaCl + 1\,I_2$

15. $1\,S_8 + 8\,O_2 \rightarrow 8\,SO_2$

Some substances in water form ions:

HCl H^+ Cl^-

NaCl Na^+ Cl^-

H_2SO_4 H^+ H^+ SO_4^{-2}

To write an ionic equation:

1.Write our the correct formulas of the ions present

2. Write a balanced molecular equation

3. Replace the formulas with ions

4. Eliminate the spectator ions

Ionic Equations:

Many ionic equations only react if dissolved in water

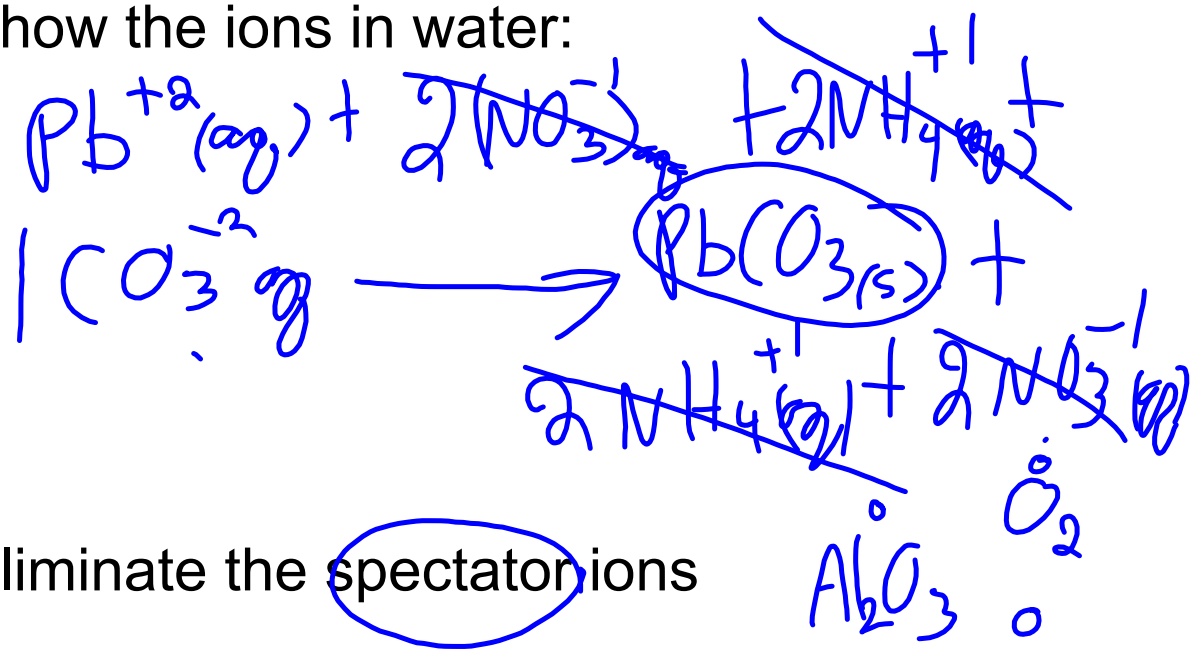
e.g. lead nitrate + ammonium carbonate ⇒ lead carbonate + ammonium nitrate

1.Write out the equation with the phases:

$Pb(NO_3)_{2(aq)} + (NH4)_2CO_{3(aq)} \Rightarrow PbCO_{3(s)}$

$+ 2NH_4NO_{3(aq)}$

2. Show the ions in water:



3. Eliminate the spectator ions

4. Rewrite net ionic equation

Balance by # of atoms and by charge

Chlorine gas + Sodium Bromide ⇒ Bromine liquid and Sodium Chloride

$Cl_{2(g)} + 2NaBr_{(aq)} \rightarrow Br_{2(l)} + 2NaCl$

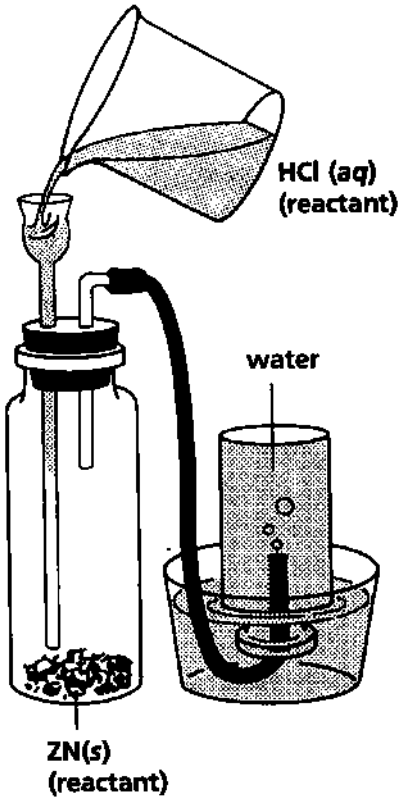
$Cl_{2(g)} + 2Na^{+}_{(aq)} + 2Br^{-}_{(aq)} \rightarrow Br_{2(l)} + 2Na^{+}_{(aq)} + 2Cl^{-}_{(aq)}$

$Cl^{0}_{2(g)} + 2Br^{-1}_{(aq)} \rightarrow Br_{2(l)} + 2Cl^{-1}_{(aq)}$

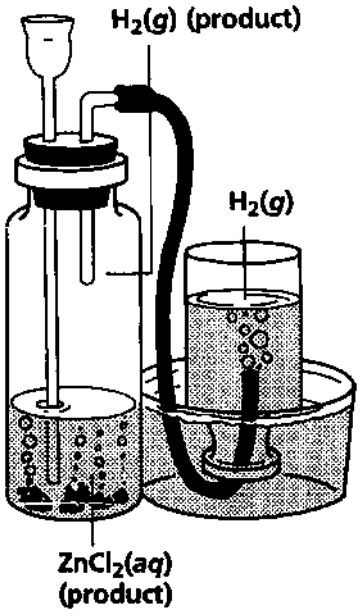
$-2 \quad | \quad -2$

$$2HCL(aq) + Zn(s) \rightarrow ZnCl_2(aq) + H_2(g)$$

Before Reaction



During Reaction

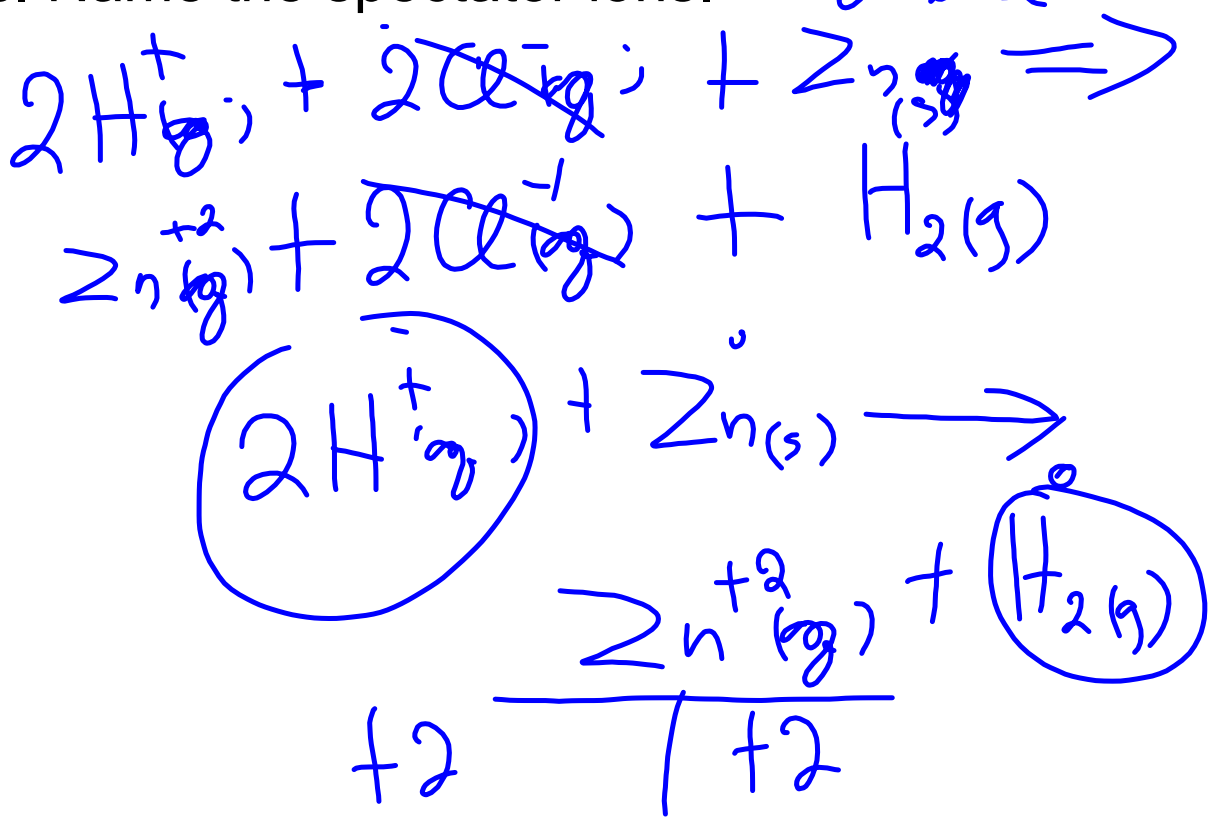


For the equation $2HCl_{(aq)} + Zn_{(s)} \Rightarrow ZnCl_{2(aq)} + H_{2(g)}$

a. What ions are present as reactants?

b. What ions are present as products?

c. Name the spectator ions.



$$Al^{+3}_{(aq)} + 3Cl^{-}_{(aq)} + 3Na^{+}_{(aq)} + PO_4^{-3}_{(aq)} \longrightarrow$$

$$Al^{+3}_{(aq)} + 3Cl^{-}_{(aq)} + 3Na^{+}_{(aq)} + PO_4^{-3}_{(aq)}$$