

States of Matter

- Solid _(s)
- Liquid _(l)
- Gas _(g)
- Aqueous _(aq)
 - A solid dissolved in water → solution
 - Example: $\text{NaCl}_{(s)} + \text{H}_2\text{O}$ vs $\text{NaCl}_{(aq)}$

Predicting States of Matter



Tips

- The following are gases at room temperature:
 - Elements – hydrogen, nitrogen, oxygen, fluorine, chlorine
 - ammonia
 - carbon monoxide and carbon dioxide
 - nitrogen monoxide and nitrogen dioxide
 - sulfur dioxide and sulfur trioxide
 - hydrogen-compounds (e.g. hydrogen chloride and hydrogen cyanide)

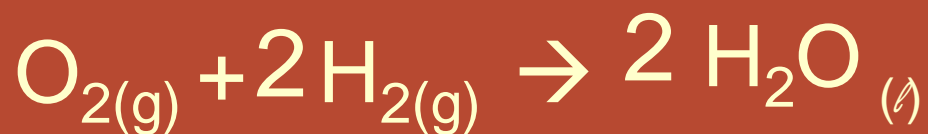
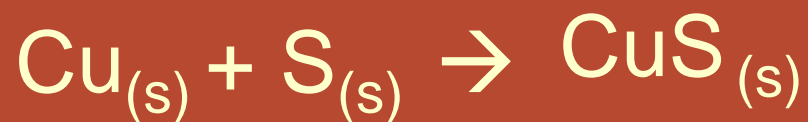
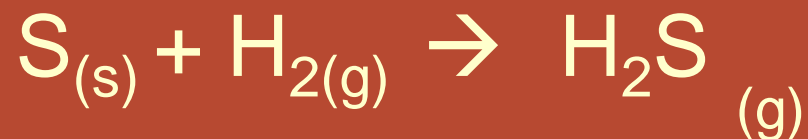
Tips

- Acids are always aqueous.
- Any phrases that refer to being dissolved or in solution means the compound is aqueous.
- Liquids – bromine, mercury, and water
- All other elements are solids. When in doubt, so are most other compounds, particularly ionic compounds.

Composition and Decomposition Reactions

- Must Use:
 - Common Sense
 - Tips
 - Ionic Compounds are solids
 - Molecular Compounds either liquid or gas
 - Diatomics usually gas

Examples



Single Replacement



Double Replacement

- Reactants are always aqueous
- Products are either:
 - One aqueous and one solid (ppt)
 - Both aqueous (soluble so no solid forms)

Double Replacement – 2 types

1. Reaction of 2 ionic salts



Are any solids produced?

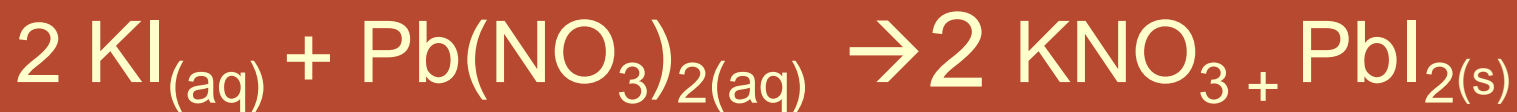
Use a solubility chart to figure this out...

Solubility Chart

- s – Soluble, a solid will not form
- si – Slightly soluble, a solid may form then dissolve, compound is solid
- i – Insoluble, a solid ppt will form

Double Replacement – 2 types

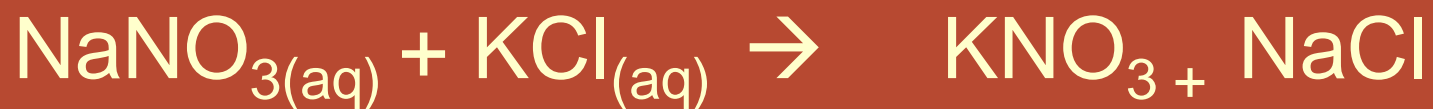
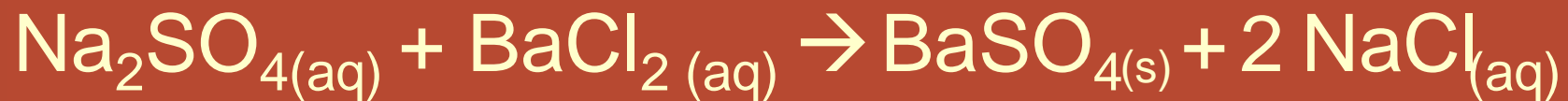
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Use a solubility chart to figure this out...

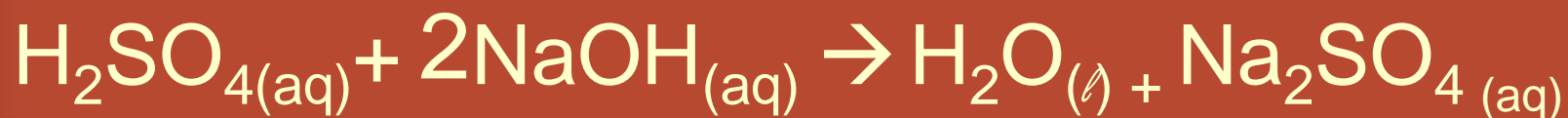
Examples



no ppt

Double Replacement – 2 types

2. Neutralization Reaction: acid + base



Combustion

