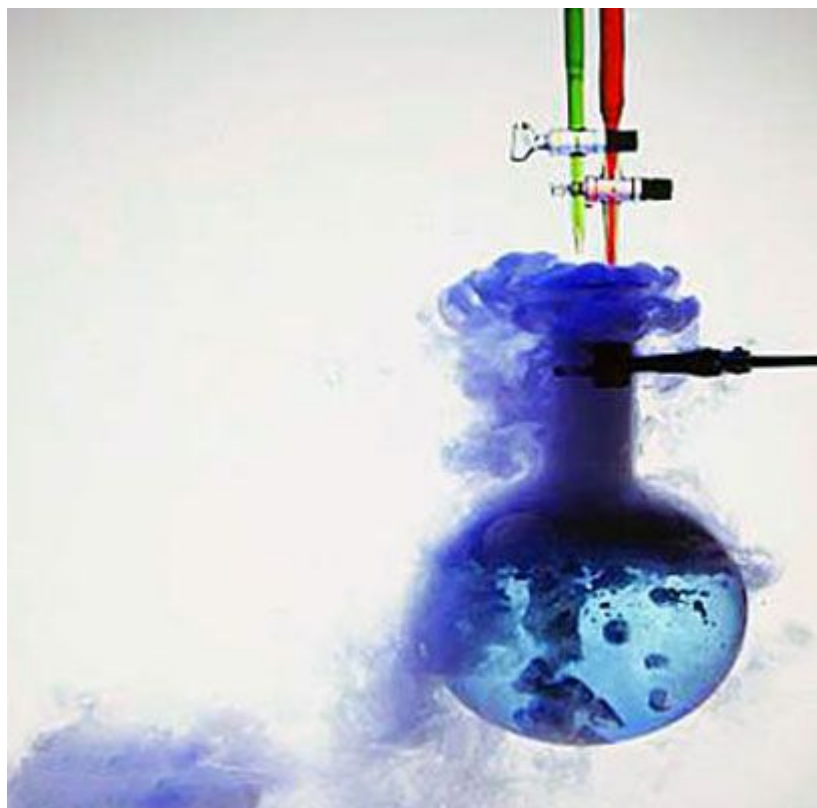


CHEMICAL REACTIONS



UNIT LEARNING GOAL

- Throughout this unit we will be working on **ALL** of our overall learning goals for this course.
- Our unit goal with respect to understanding concepts is:

We are learning about the different types of chemical reactions.



TO HELP SUPPORT THIS LEARNING GOAL TODAY'S GOALS ARE...

- We are learning to identify the types of chemical reactions, **today's focus will be on synthesis, and decomposition reactions.**
- We are learning to **predict the products of different types of synthesis and decomposition reactions.**



5 MAJOR TYPES

- **SYNTHESIS**
- **DECOMPOSITION**
- **SINGLE DISPLACEMENT**
- **DOUBLE DISPLACEMENT**
- **COMBUSTION**



SYNTHESIS



+



SYNTHESIS

- ❑ Simple substances combine to form more complex compounds
- ❑ Product can either be ionic or molecular



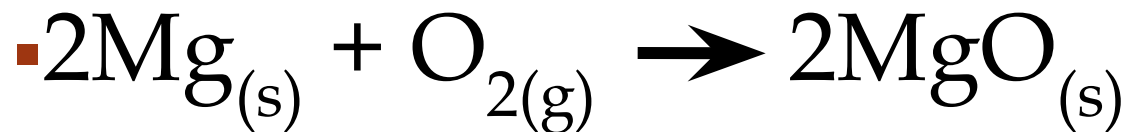
- ❑ element + element \rightarrow compound
- ❑ compound + element \rightarrow complex compound
- ❑ compound + compound \rightarrow very complex compound

5 types of Synthesis Reactions



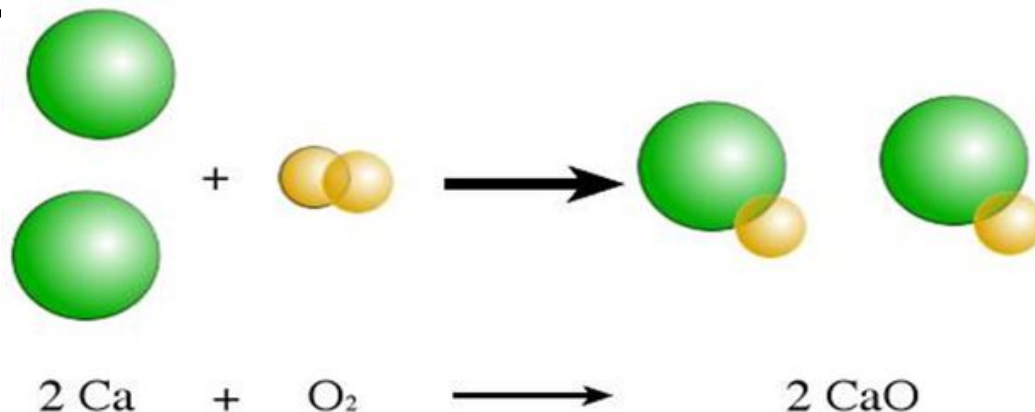
SYNTHESIS: TYPE 1

PRODUCTION OF METAL OXIDES



Element + oxygen \rightarrow OXIDE

AP STYLE – “MODELLING”
SYNTHESIS

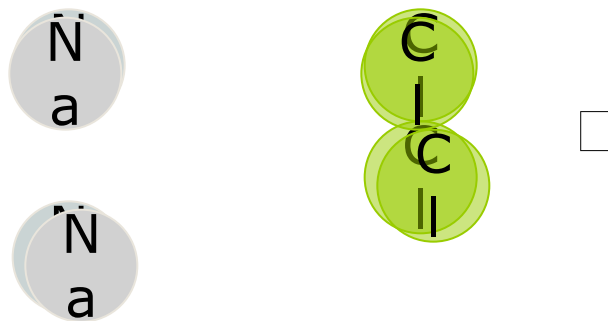


SYNTHESIS: TYPE 2

PRODUCTION OF SALTS

BINARY COMPOUNDS (ionic compounds – salts)

Direct combination reaction (Synthesis)



General form: A

+

B

→

AB

element or
compound

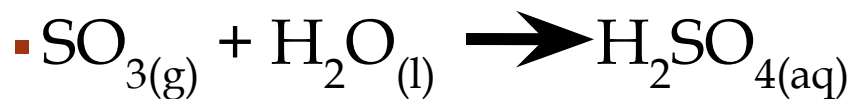
element or
compound

compound



SYNTHESIS: TYPE 3

PRODUCTION OF ACID

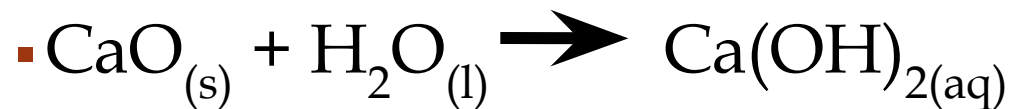


Non-metal oxide + Water \longrightarrow ACID

- *** Recall: Acid contains H (gets it from water)*

SYNTHESIS: TYPE 4

PRODUCTION OF BASES

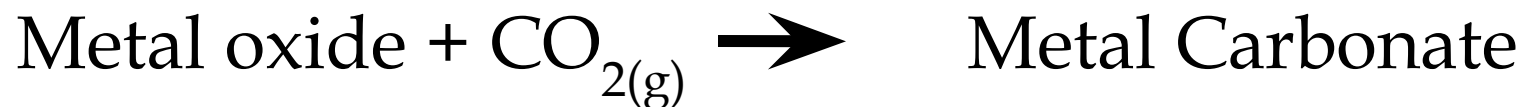
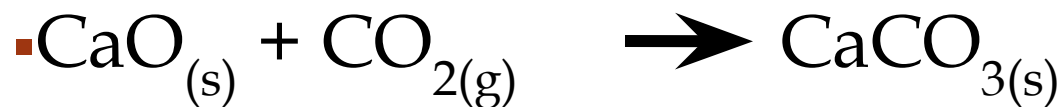


Metal oxide + water \longrightarrow BASE



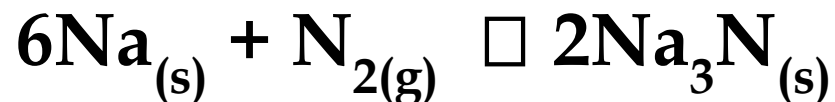
SYNTHESIS: TYPE 5

Production of Metal carbonate



YOUR TURN!!

- Write the equation for the synthesis of solid sodium nitride by burning sodium metal in nitrogen gas AND draw a model to represent it!



DECOMPOSITION



DECOMPOSITION

- A compound is broken down into simpler substances

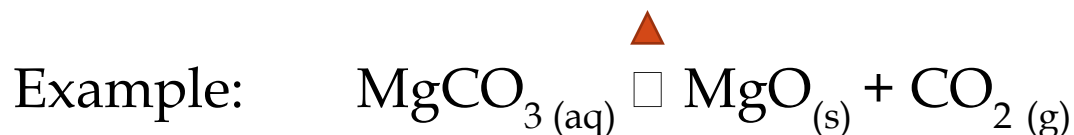


Often requires
energy. i.e. Heat ▲

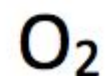
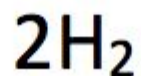
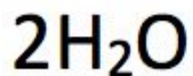
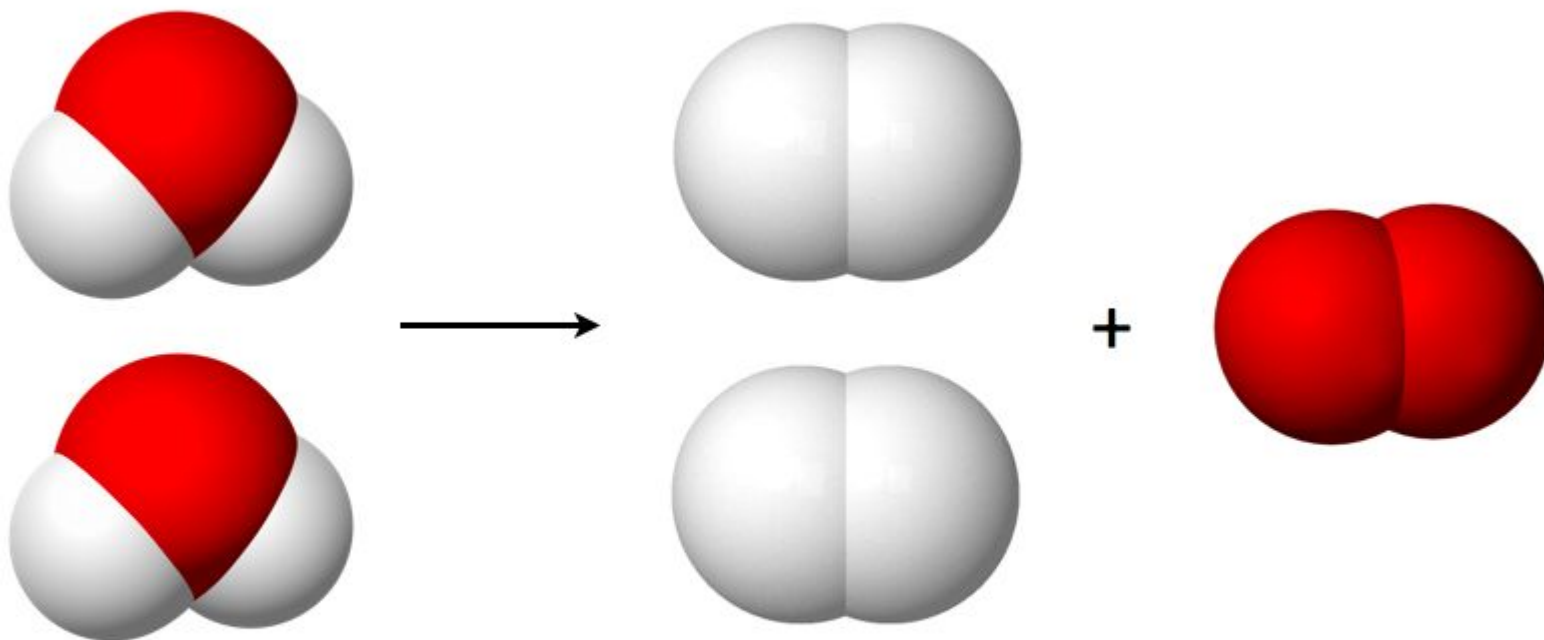
Can be elements
or compounds



- Special case: Metal CARBONATES decompose to produce the metal oxide and carbon dioxide gas.

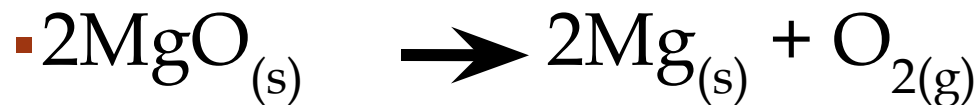


AP STYLE – MODELLING DECOMPOSITION



EXAMPLES

- Decomposition of Binary Compounds

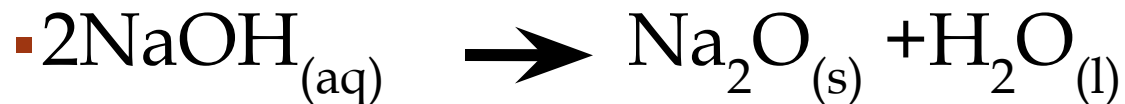


Compound \rightarrow element + element



EXAMPLES

- Decomposition of Hydroxides

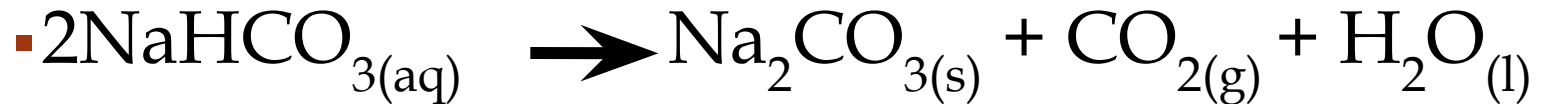


Hydroxide \rightarrow metallic oxide + water



EXAMPLES

- Decomposition of Bicarbonates

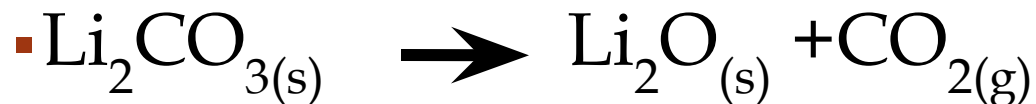


Bicarbonate \rightarrow metallic carbonate + carbon dioxide + water



EXAMPLES

- Decomposition of Carbonates

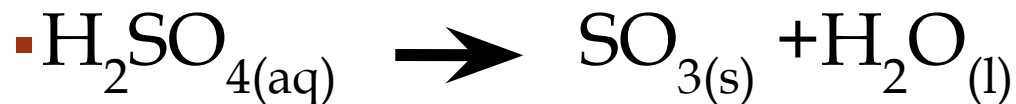


carbonate \rightarrow metal oxide + carbon dioxide



EXAMPLES

- Decomposition of Oxyacids

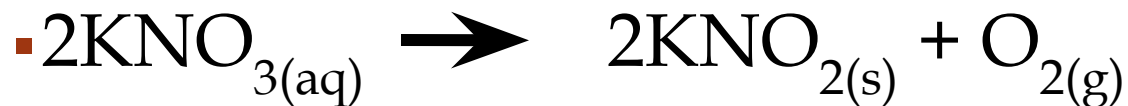


Oxyacid \rightarrow non-metal oxide + water



EXAMPLES

- Decomposition of Nitrates

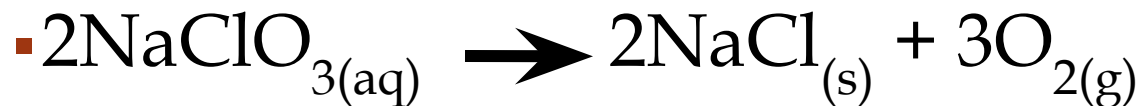


Nitrate \rightarrow Nitrite + oxygen



EXAMPLES

- Decomposition of Chlorates



Chlorate \rightarrow metal chloride + oxygen



SUCCESS CRITERIA

- **At the end of this lesson...**
- **I can identify synthesis and decomposition reactions.**
- **I can predict the products of different types of synthesis and decomposition reactions.**

