

A-Level Chemistry

Name: _____ Score: _____

1. Reactivity increases down Group 2 because:
 - ☐ the atoms get larger and lose their outer electrons more easily
 - ☐ the atoms get smaller
 - ☐ the nuclear charge falls
 - ☐ they gain electrons
2. Heating a Group 2 carbonate produces:
 - ☐ the metal oxide and carbon dioxide
 - ☐ the metal and oxygen
 - ☐ the hydroxide and hydrogen
 - ☐ nitrogen dioxide only
3. A Group 2 metal reacting with water forms:
 - ☐ a hydroxide and hydrogen gas
 - ☐ an oxide and oxygen
 - ☐ a chloride and hydrogen
 - ☐ a carbonate
4. Thermal stability of the carbonates increases down Group 2 because:
 - ☐ a larger metal ion polarises the carbonate ion less, so it is harder to break apart
 - ☐ the metal ion gets smaller
 - ☐ the carbonate ion gets larger
 - ☐ the temperature falls
5. The oxides and hydroxides of Group 2 metals are:
 - ☐ basic
 - ☐ acidic
 - ☐ amphoteric
 - ☐ neutral
6. Group 2 metals form ions with a 2+ charge.
 - ☐ True ☐ False

7. Group 2 carbonates become more thermally stable down the group.
- ☐ True ☐ False
8. Down Group 2:
- ☐ hydroxide solubility increases, while sulfate solubility decreases
- ☐ both increase
- ☐ both decrease
- ☐ hydroxide solubility decreases, sulfate increases
9. A Group 2 carbonate reacting with a dilute acid produces:
- ☐ a salt, water and carbon dioxide
- ☐ a hydroxide and hydrogen
- ☐ an oxide only
- ☐ nitrogen dioxide
10. Heating a Group 2 nitrate produces:
- ☐ the oxide, brown nitrogen dioxide and oxygen
- ☐ the metal and nitrogen
- ☐ only the oxide
- ☐ the carbonate

A-Level Chemistry

1. the atoms get larger and lose their outer electrons more easily

Larger atoms hold their two outer electrons less tightly, so they are lost more readily.

2. the metal oxide and carbon dioxide

Thermal decomposition: $\text{CaCO}_3 \rightarrow \text{CaO} + \text{CO}_2$.

3. a hydroxide and hydrogen gas

e.g. $\text{Ca} + 2\text{H}_2\text{O} \rightarrow \text{Ca(OH)}_2 + \text{H}_2$; the reaction gets faster down the group.

4. a larger metal ion polarises the carbonate ion less, so it is harder to break apart

A big cation distorts the carbonate ion less, so more energy (a higher temperature) is needed to decompose it.

5. basic

They are basic — they react with water and neutralise acids.

6. True

They lose their two outer electrons.

7. True

Larger cations polarise the carbonate less.

8. hydroxide solubility increases, while sulfate solubility decreases

Hydroxides become more soluble (Ba(OH)_2 soluble); sulfates become less soluble (BaSO_4 insoluble).

9. a salt, water and carbon dioxide

e.g. $\text{CaCO}_3 + 2\text{HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$.

10. the oxide, brown nitrogen dioxide and oxygen

e.g. $2\text{Ca(NO}_3)_2 \rightarrow 2\text{CaO} + 4\text{NO}_2 + \text{O}_2$ (brown NO_2 gas is given off).