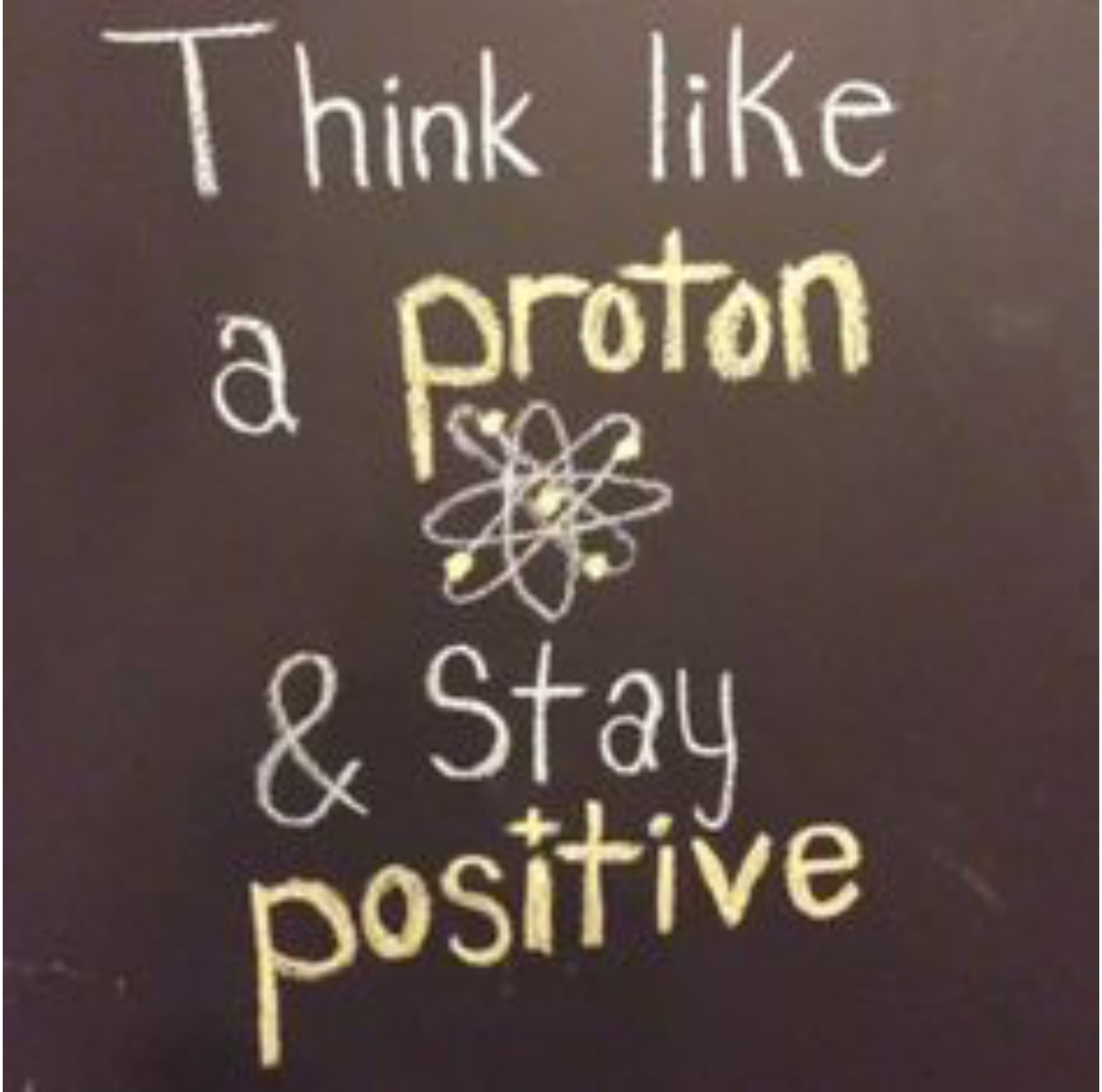
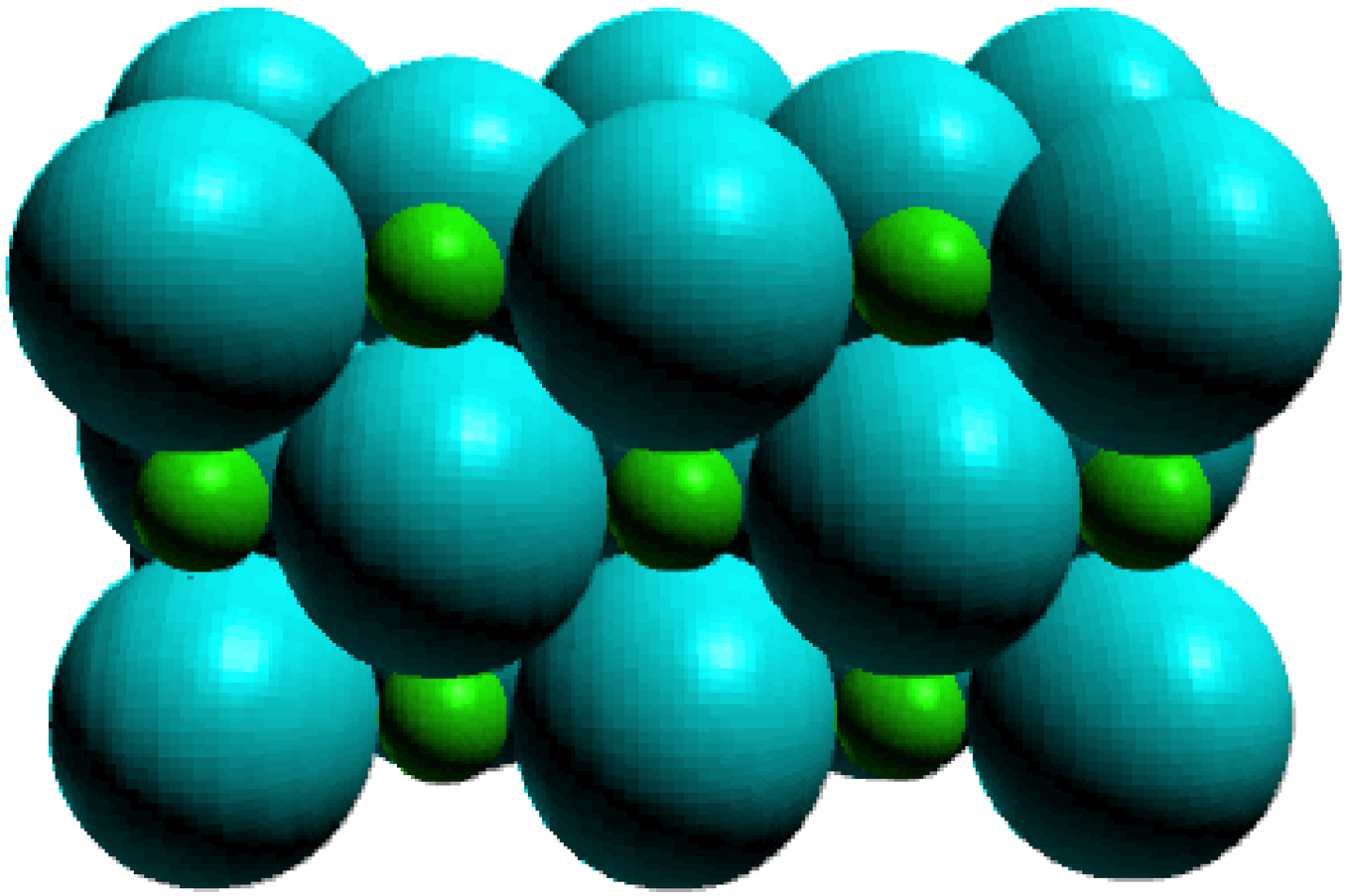
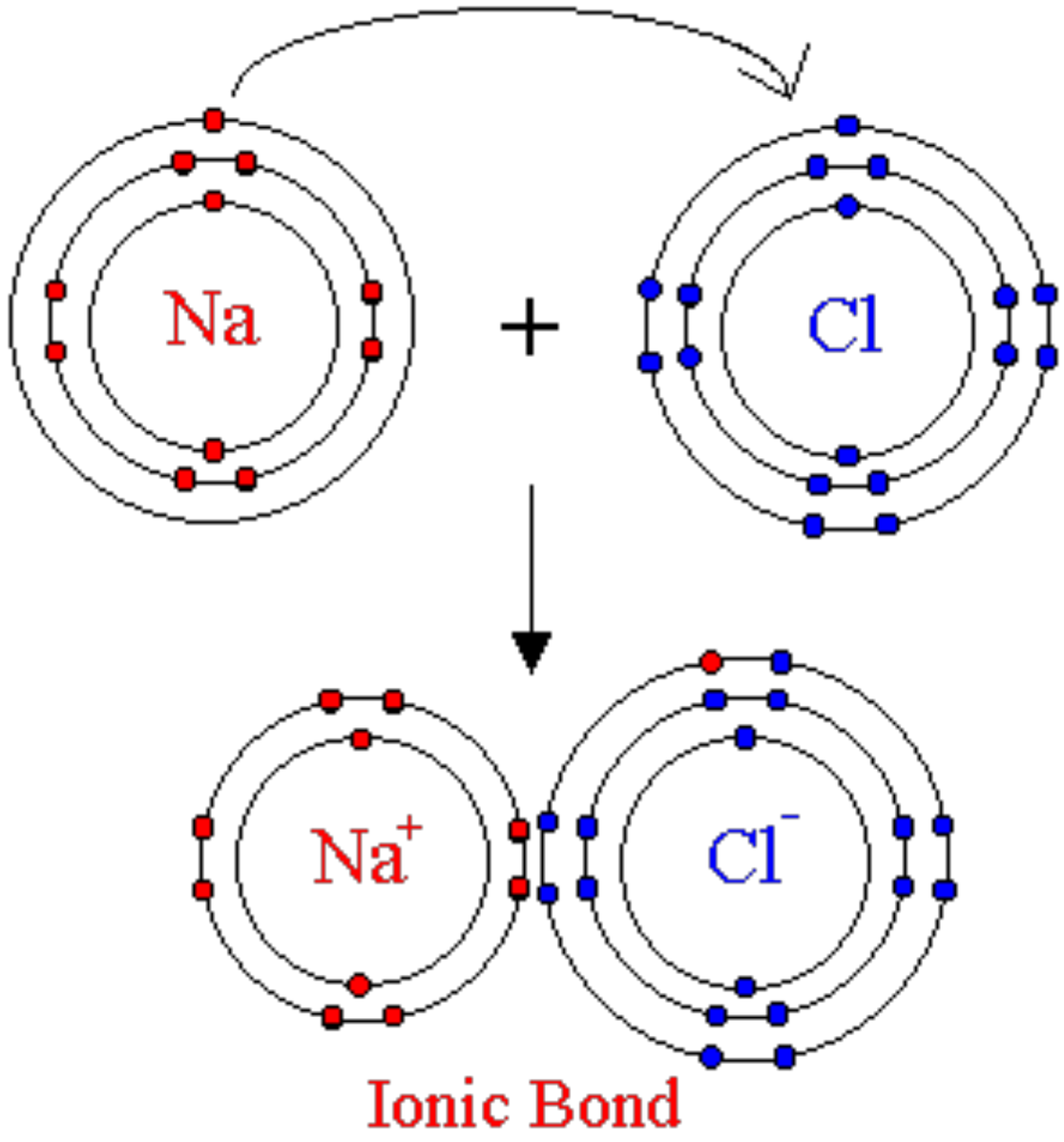

Think like
a proton
& Stay
positive

Ionic Compounds



Ionic Bonding

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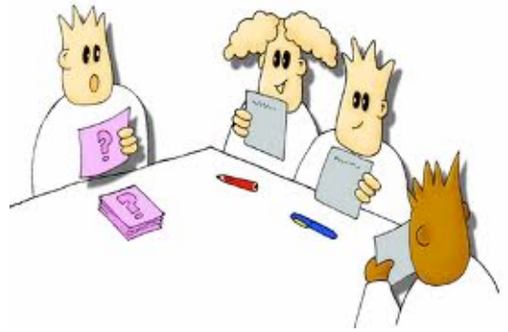
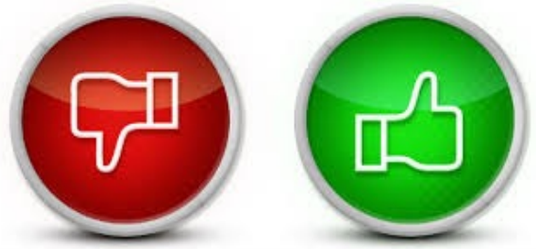


- Examine the table below. Which compound is an example of an ionic compound? Explain how you know.

	Description	**Melting Point**	**Solubility**	**Conductivity**
A	- white square crystals	186 ^{o}C	Yes	No
B	- white powder	175 ^{o}C	No	No
C	- yellow crystals	1176 ^{o}C	Yes	Yes



Ionic Compounds:

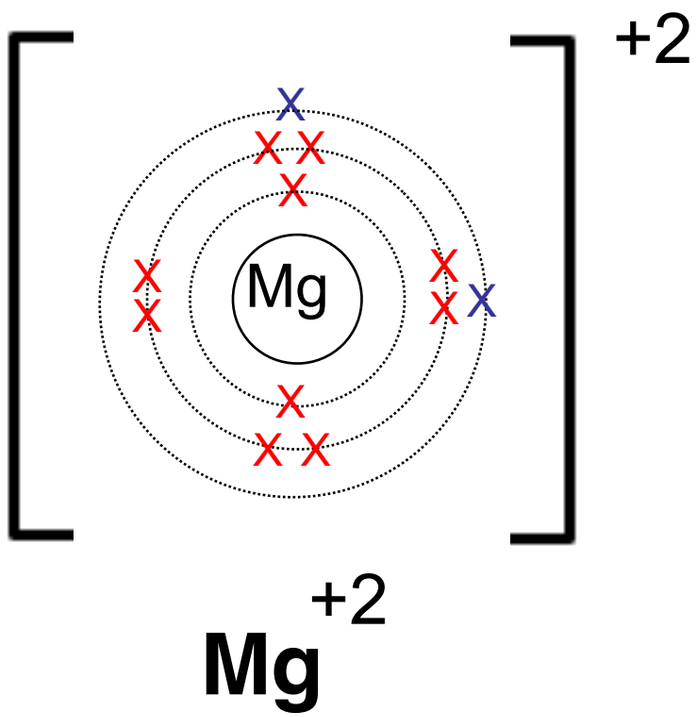
- are all white crystals
- are formed between metals and non-metals
- conduct electricity
- are malleable
- dissolve in water
- are all toxic
- have high melting points
- are fragile and can shatter
- are all crystals

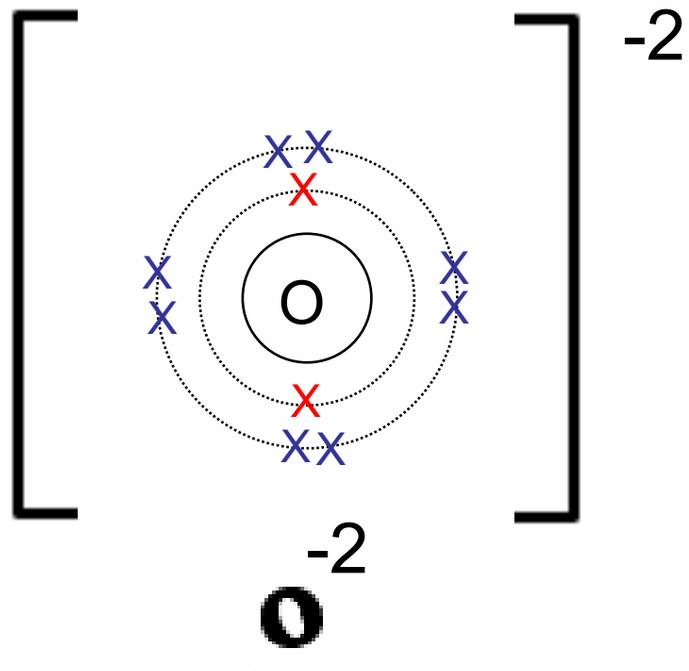
Ionic Compounds:

- are formed between metals and non-metals
- conduct electricity
- dissolve in water
- have high melting points
- are fragile and can shatter
- are all crystals

Remember…

- **Metals** ions have a (+) charge = **CATIONS**
- **Non metals** ions have a (**-**) charge = **ANIONS**



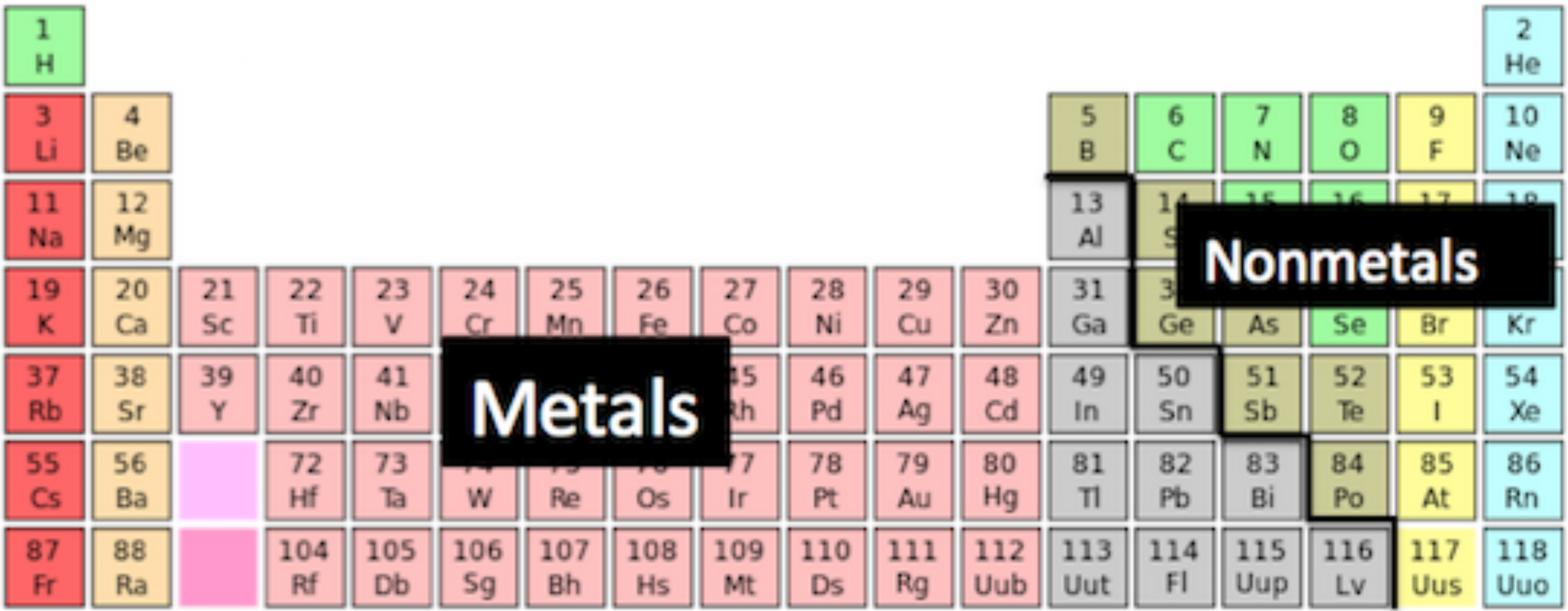


Ionic Compounds

- are made by the combination of a **metal (positive ion)** and a **non- metal** (**negative ion).**

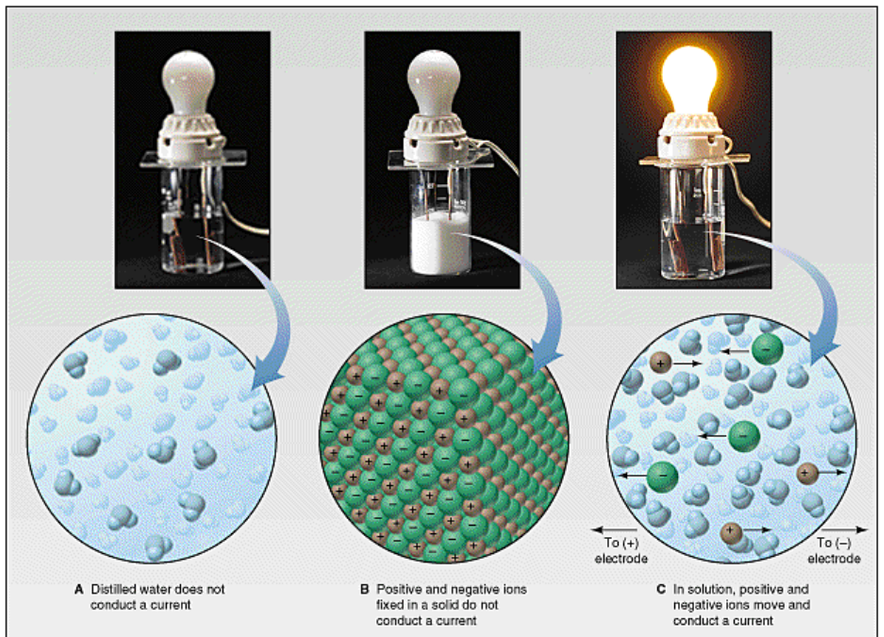
eg., sodium + chlorine —> sodium chloride

magnesium + oxygen —-> magnesium oxide



General properties of Ionic Compounds

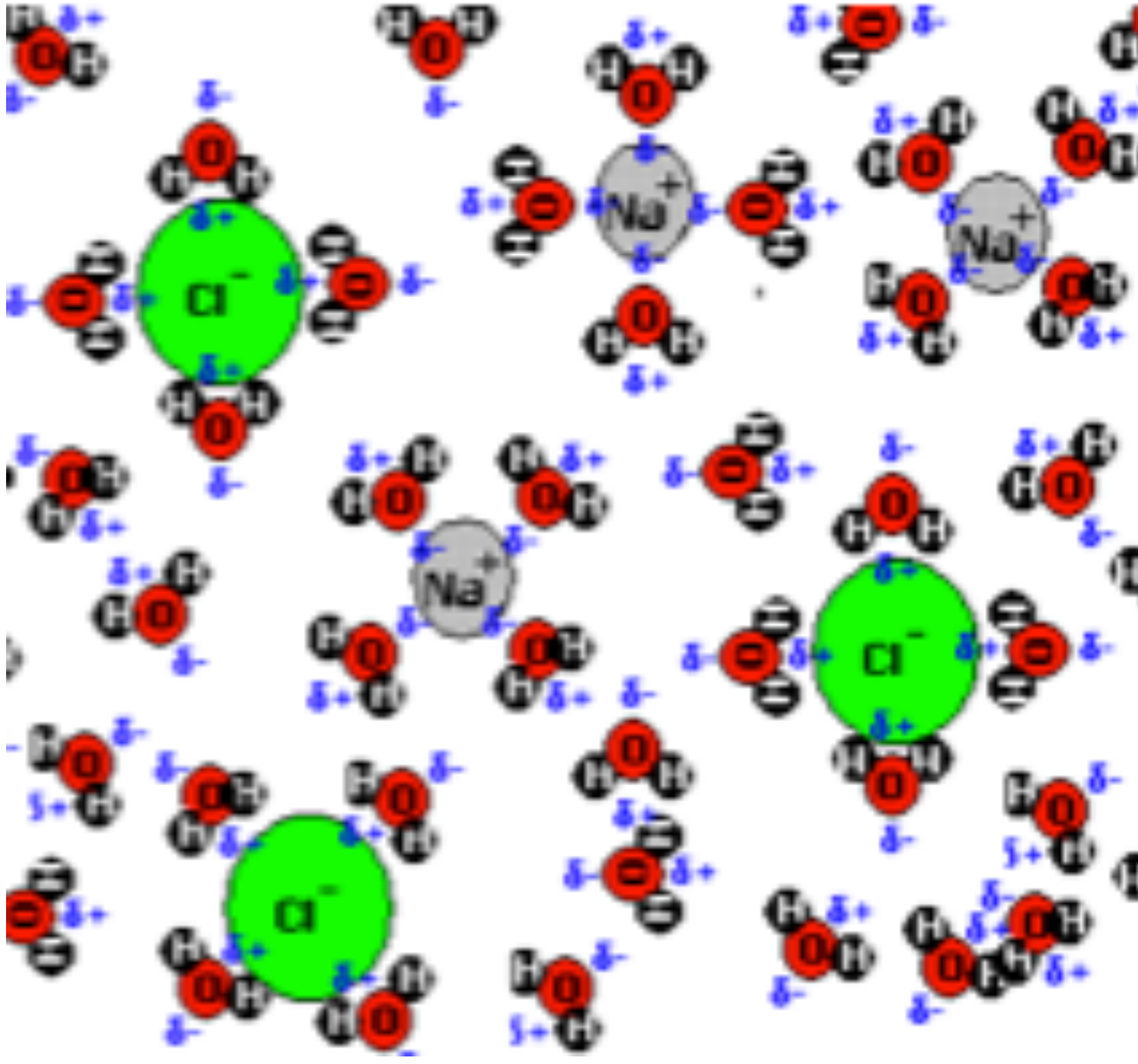
- are usually solids and form **crystals**.
- known as **salts**
- have **High** melting point
- are **brittle** and shatter under **pressure**
- When **dissolved** in water they **conduct electricity**



How do ionic compounds conduct electricity?

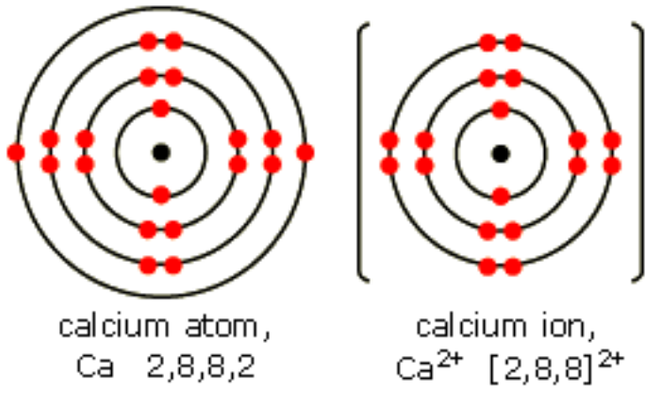
- Salt crystal has even patterns of the metal and non-metal in a crystal

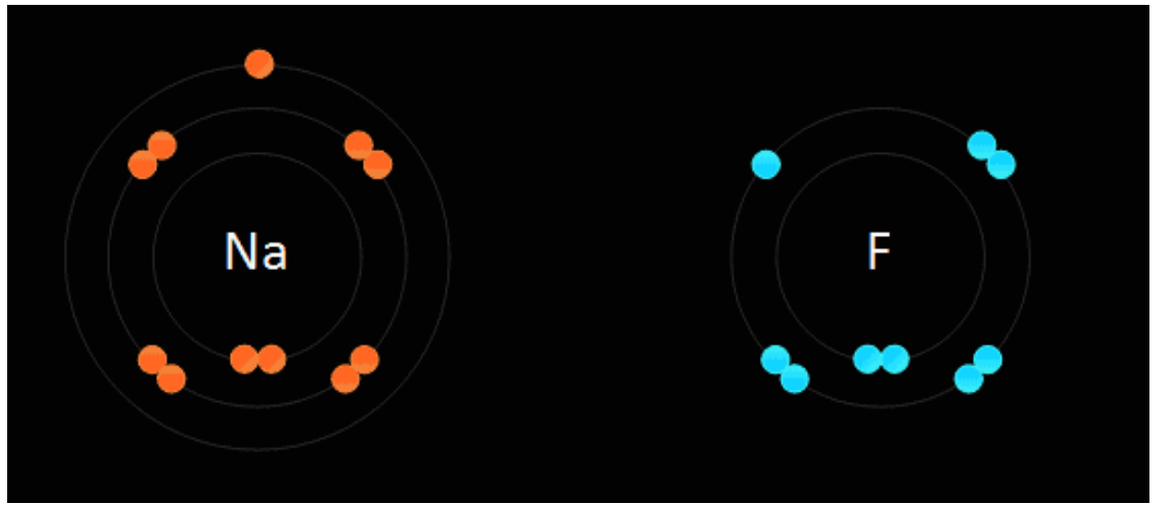
- When dissolved, the ions separate in water



Ionic Bonding

- **Ionic compounds** occur when a metal cation(+) and a non-metal anion(-) attract and bind.
- The charge of each ion correlates to the number of electrons lost or gained.





- The two oppositely charged ions are attracted to each other by a force called an **ionic bond**.

Ionic Compound Formulation

1. Write down the symbols of the ions involved.

calcium and fluorine

Ca^{2+} F^{1-}

2. Determine the lowest whole number ratio of ions that will give a net charge of zero.

Ca^{2+} F^{1-}

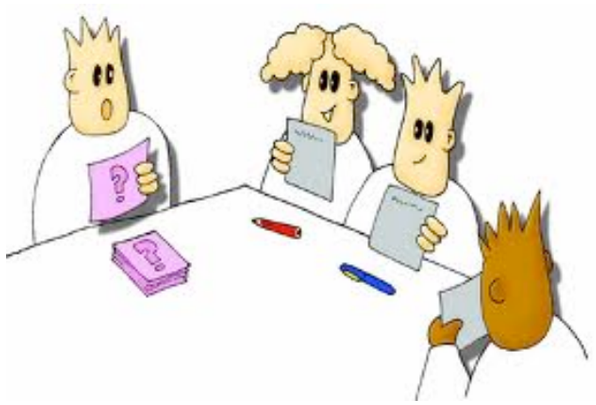
1 x 2+ = **2+** **2** x 1- = **2-**

3. Write the formula removing all charges.

Ca_1F_2

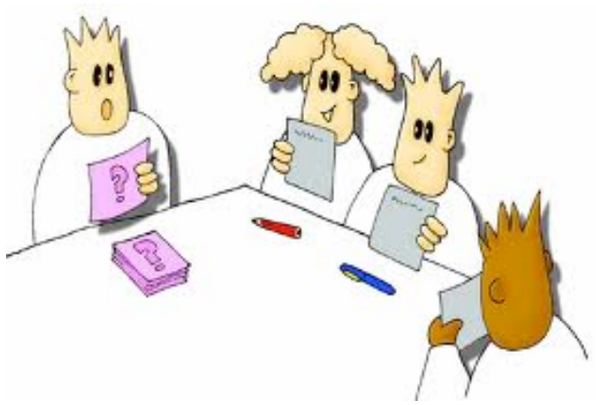
↓

CaF_2



Example 3- Try yourself

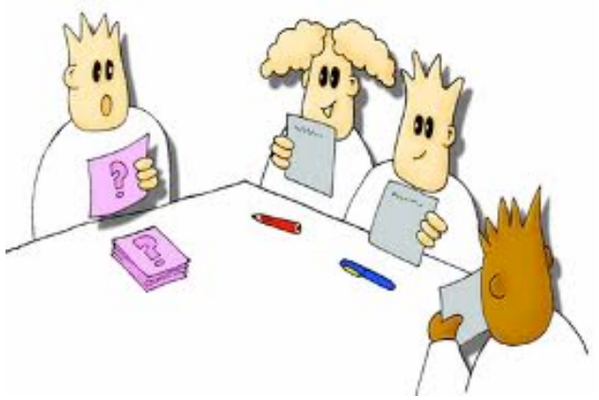
Zirconium Oxygen



Example 4- Try yourself

Aluminum

Sulfur



Example 5- Try yourself

In this case, nickel like many transition metals, has more than one possible ionic charge. The roman numeral indicates which ionic charge that should be used.

(2+)

Nickel (II)

Nitrogen

IUPAC nomenclature

- is a system of naming chemical compounds.

- It is maintained by the International Union of Pure and Applied Chemistry.

Ionic Binary Compounds

- An **ionic binary compound** contains one metal and one non-metal. Either element may have multiple atoms.

e.g. CaF_2, $NaCl$, Fe_2O_3

Ionic Binary Compounds: IUPAC Naming

- Consists of two types of **monoatomic ions**

1. The metal ion is always written first and retains its whole name
2. The non-metal is written second and has a slight change, the ending (suffix) is changed to ***–ide***

- Do not write ones (e.g. Na_1Cl_1) and if both elements have the same number reduce to lowest terms (Ca_2O_2 = CaO)

Ionic Multivalent Binary Compounds

- A multivalent compound is one that may have varied numbers of electrons in its valence shell.

  e.g. Cu^{1+} *or* Cu^{2+}

- The transition metals are elements that commonly have multiple valence shell electrons.

- This means that they can form different compounds with different proportions.

- Example: **Copper + Oxygen**

- Copper and oxygen could have two different formulas with two completely different properties.

  e.g. ***CuO*** *and* ***Cu_2O***

- In order to differentiate between the two, compounds use a different name to avoid confusion.

Ionic Multivalent Binary Compounds: IUPAC Naming

- Same as Ionic Binary but it indicates the metals charge in ROMAN NUMERAL

Sn^{4+} O^{2-} → SnO_2 → *tin (IV) oxide*

Sn^{2+} O^{2-} → SnO → *tin (II) oxide*

- List the metal name first

- After the metal name indicate the ion charge in brackets using roman numerals.

- The non-metal has ***-ide*** suffix added.