Properties of Ionic & Molecular Bonds

Video Workbook with Dr. B

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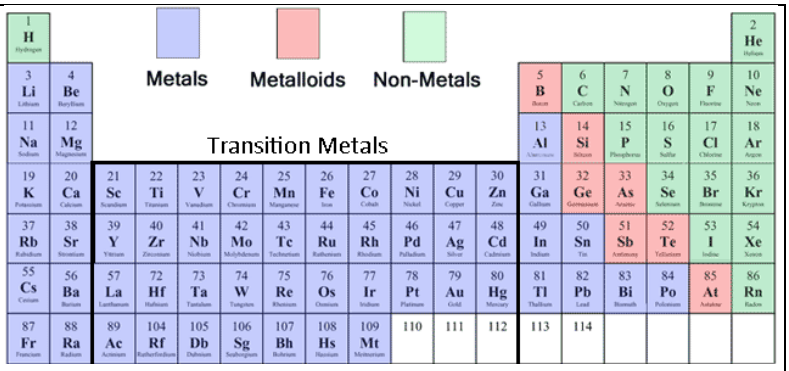
Metal + Non-Metal = *Ionic*

We use ionic charge with ionic compounds!

Non-Metal + Non-Metal = *Molecular*

We **do not** use ionic charge with molecular compounds!



The atoms in Ionic compounds **transfer** electrons.

The atoms in Molecular (also called Covalent) compounds **share** electrons.

This results in them having different properties (in general).

Key Terms

A **chemical bond** forms when valence electrons are transferred (ionic) or shared (molecular) between atoms.

Bonds are formed to fill their highest energy level (often called an **Octet**). Noble gases have octets.

Ionic Bond—a strong bond between a metal cation (positive ions) and non-metal anion (negative ions)

Ion—atoms that have a charge (+ or -).
Lost electron = + charge = cation.
Gained electron = - charge = anion.

Molecular (Covalent) Bond—a semi-strong bond between two non-metals.

For example:

Which compound would share electrons: $CaCl_2$ or SO_2?
Which compound would be ionic: NaCl or $CuCl_2$?
Which would have a stronger bond: MgO or CH_4?

Answers: SO_2 is molecular so it would share electrons. Both NaCl and $CuCl_2$ are ionic compounds. MgO is ionic so it would have a strong bond.

Properties of Ionic and Molecular Compounds

Property	Ionic Bonds	Covalent Bonds
State	crystalline solids	solids, liquids, gases
Melt/Boiling Point	High	Low
Solubility	Usually dissolves in water but not in non-polar liquids	Usually soluble in non-polar liquids but not in water
Conductivity	Conducts electricity when melted or dissolved in water.	Does not conduct electricity.
Hardness	Hard and brittle	For covalent solids - usually soft

Quiz (answers provided at end of quiz, you can retake this quiz multiple times).

Report errors and suggestions to DrB@breslyn.org