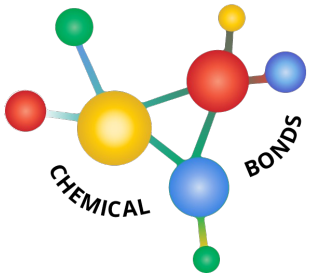
Atomic Interactions

Chemistry is based on the direct interaction of two or more particles

Bonding

The connection between to or more particles due to the transfer or sharing of electrons between the atoms.

Bonds include
Ionic, Polar Covalent, Non-Polar Covalent



States of Matter

The connection between to or more particles due to the electronic interaction between the particles

States include
Solid, Liquid, and Gas

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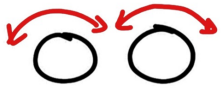
Collisions and atomic motion

Elastic Collision

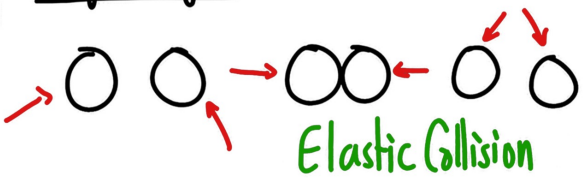
When particles collide they transfer energy to each other. Each particle collides then moves away.

Solid



vibrations
Elastic Collisions

Liquid/gas collision, bounce



Elastic Collision

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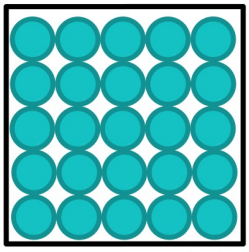
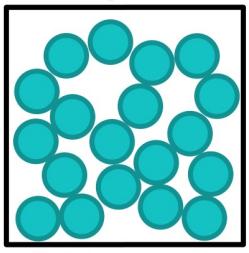
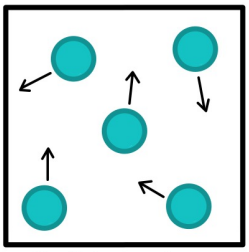
States of Matter

The interactions between particles based on the energy of matter

Solids	Liquids	Gases
		
Particles are packed tightly together in a fixed arrangement. Particles can vibrate but not move	Particles are close together with no distinct arrangement. Particles can move and slide around each other	Particles are free-floating with no distinct arrangement. Particles move and collide with each other

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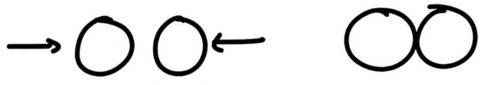
Collisions and atomic motion

Inelastic Collision

When particles collide they transfer energy to each other. When bonding occurs they stick together and connect

A chemical bond is a electron connection between two or more atoms.

Inelastic Collision



Individual Atoms

Chemical bond

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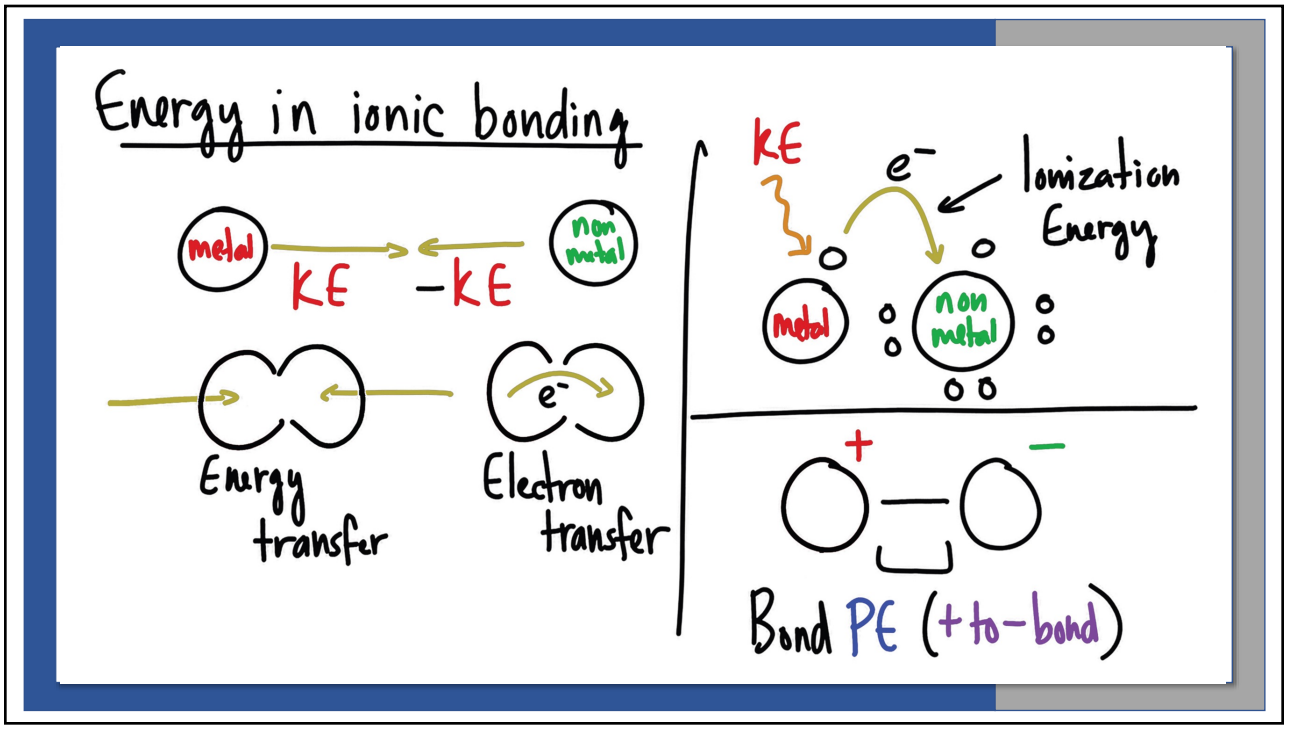

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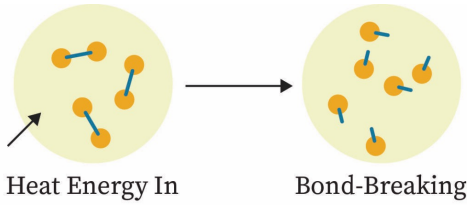
Forming and Breaking Ionic Bonds

Bonds are formed or broken based on energy of matter

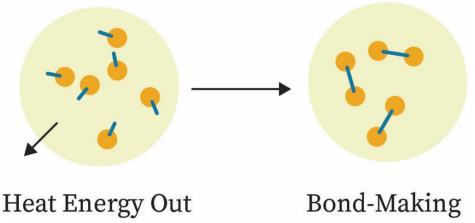
Breaking Ionic Bonds

Bonds break when energy is added (*endothermic*) to a system (KE)



Forming Ionic Bonds

Bonds are formed when energy is removed (*exothermic*) from a system (KE)



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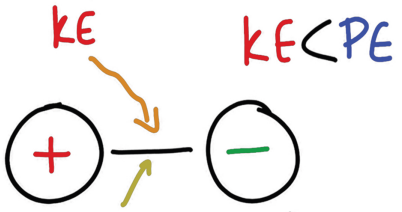
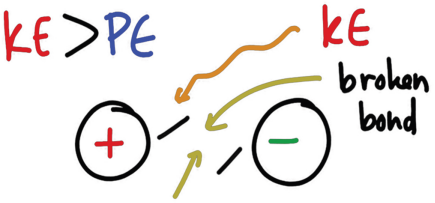
Breaking Ionic Bonds



Bond Energy (PE)

With a large bond energy bond doesn't break



Bond Energy (PE)

A large bond energy can be broken when KE>PE (Ionization)

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Comparing Ionic and Covalent Bonding

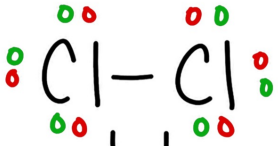
Ionic: Transfere⁻
High PE bonds

$Na^{+} - Cl^{-}$

+/− attraction

Stronger Ionic Bond

Covalent: Share e⁻
Lower PE bonds



Shared pair e⁻

Weaker non-polar bond

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