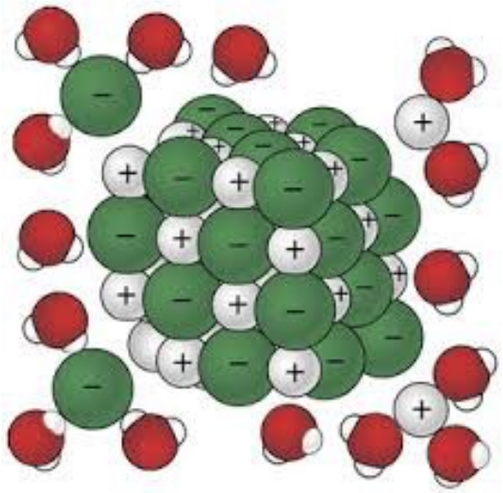
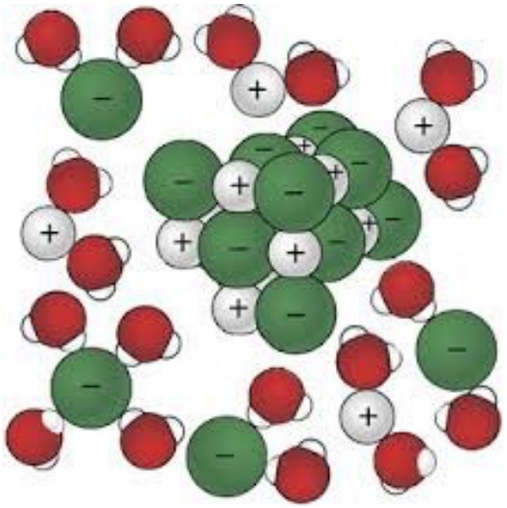
Properties of Ionic & Metallic Bonds

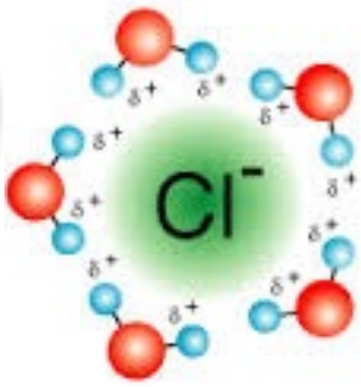
Unit 3: Ionic Properties

1. ionic compounds <u>dissolve in water</u> because ions are attracted to (+) and (-) sides of water molecules

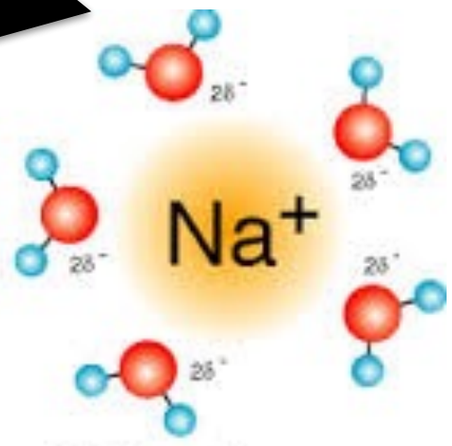




ions on the outer layer are attracted from crystal lattice away first

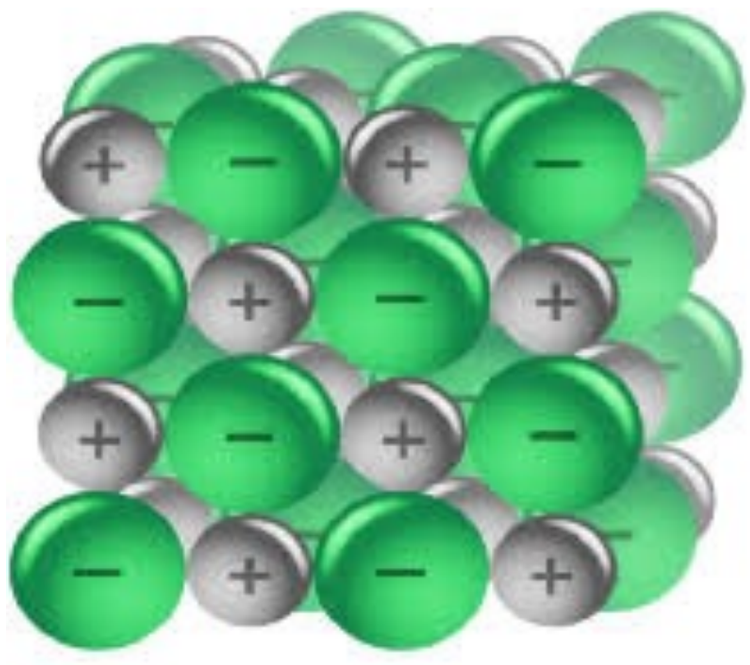


Slightly positive hydrogen are attracted to chlorine anions



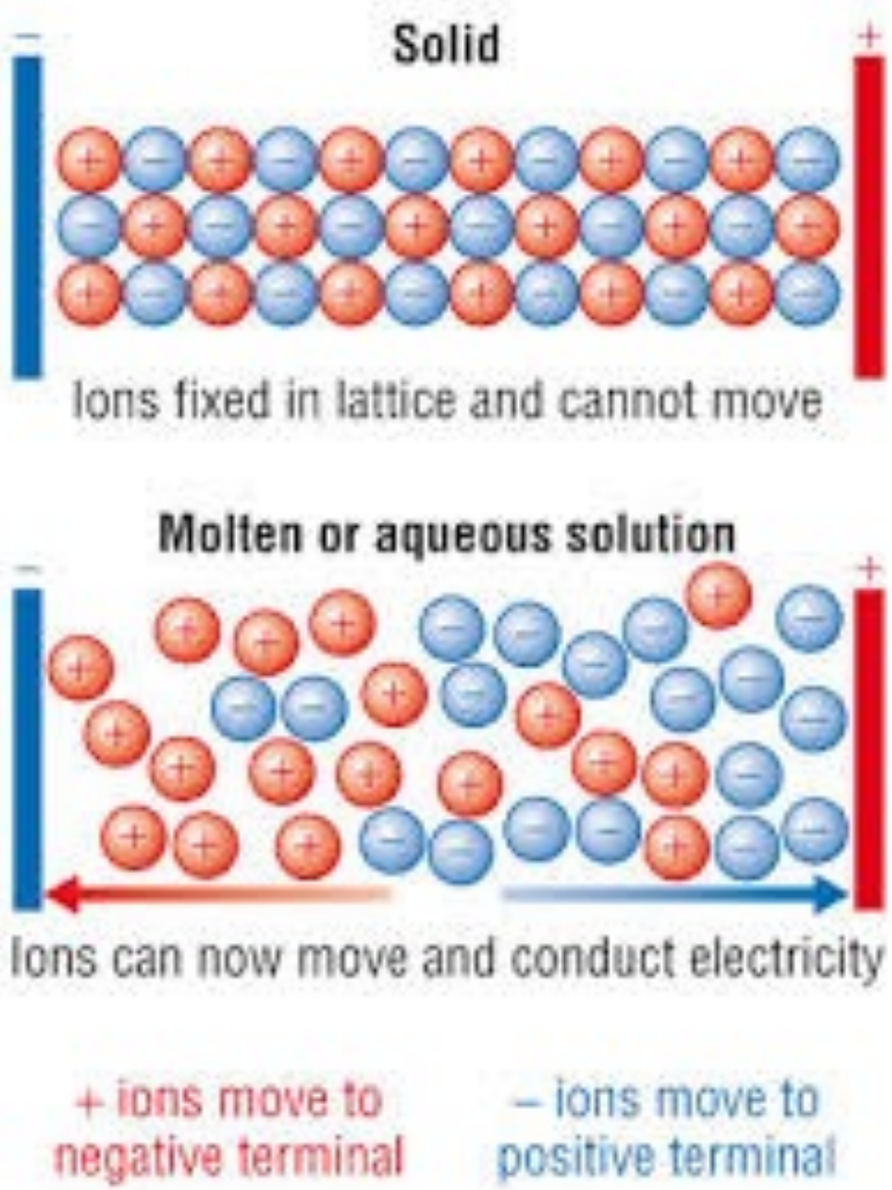
Slightly negative oxygen are attracted to sodium cations

2. <u>high melting & boiling points</u> -
Crystal lattice structures have ions that have full octets (stable) and are surrounded by opposite charge (happy) so it takes a lot of energy to separate the ions.

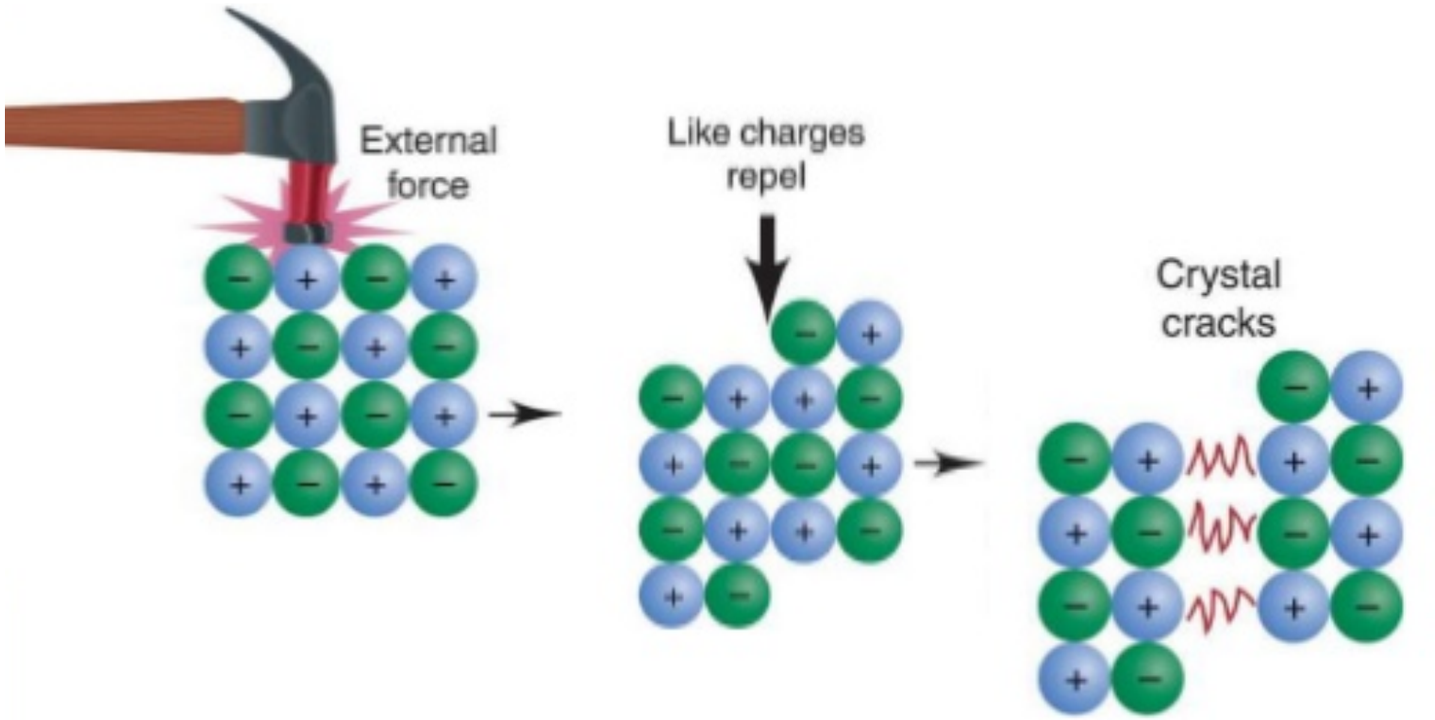


3. Ionic compounds can <u>conduct electricity when melted or dissolved</u> because the ions can move

(electrolyte - dissolved or melted ionic compound that can conduct electricity)



4. Ionic solids are <u>hard and brittle</u>



Summary of properties for ionic compounds:

Like teenagers:

- **Difficult to force apart (melting)**

You don't need to write the next 4 summary slides :)

No one can break us up!

Summary of properties for ionic compounds:

Like teenagers:

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- **Easy to separate if attracted to someone else (dissolving)**

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Like teenagers:

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- **If teenagers can move they can spread the word (conduction of molten or liquid states) If they can't move they can't spread the word (no conduction in solid state)**

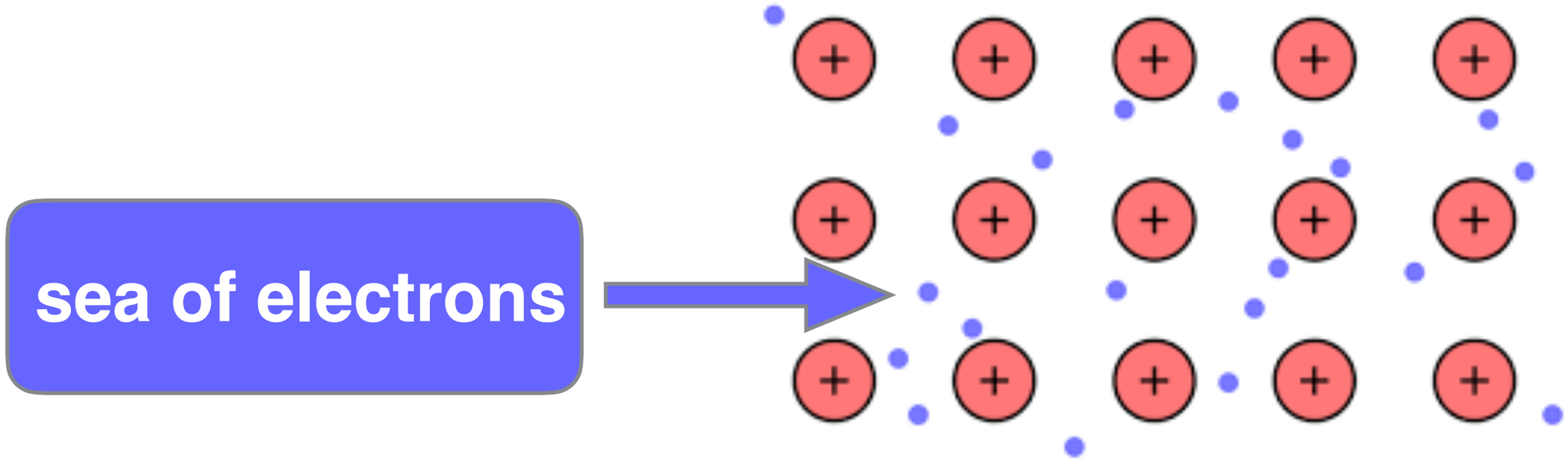
Summary of properties for ionic compounds:

Like teenagers:

- *Difficult to force apart (melting)*
- *Easy to separate if attracted to someone else (dissolving)*
- *If teenagers can move they can spread the word (conduction of molten or liquid states) If they can't move they can't spread the word (no conduction in solid state)*
- **If you force them with someone they really, really don't like they will split apart (shatter/brittle).**

Metallic Bonds -

- metals hold valence e^- weakly
- metals donate their valence electrons to the “sea of electrons”
- resulting cations are attracted to the delocalized electrons



alloy - mixture of metals held together by metallic bonds

Summary of Properties

	Ionic Bonds	Metallic Bonds
melting and boiling points	high	generally high
thermal and electrical conductivity	only when dissolved or melted (not as solids)	good conductors
hardness and malleability	hard and brittle	variable hardness, malleable (can be shaped) and ductile (drawn into a wire)
other	dissolve in water	lustrous (shiny, e^- absorb and re-emit light)