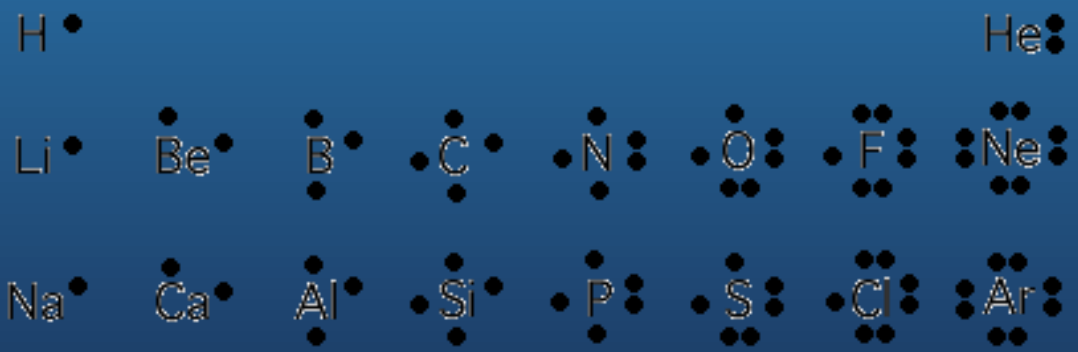
CHEMICAL ACTIVITY CHEMICAL BONDING

Lewis Dot Notation

- Lewis Dot Notation shows only the outer valence electrons in its diagram.
- An element found in the first column, for example, will only have one dot drawn to show its outer orbit.
- An element found in the seventh column, for example, will have seven dots drawn to show its outer orbit.



The Octet Rule

- When we look at the way that an element reacts with other elements, we can determine its chemical activity based on the number of valence electrons
- Elements will always want to either gain or lose electrons to become stable GROUP VIII elements
- Elements that have one electron will lose that single electron to reach Group VIII

The Octet Rule

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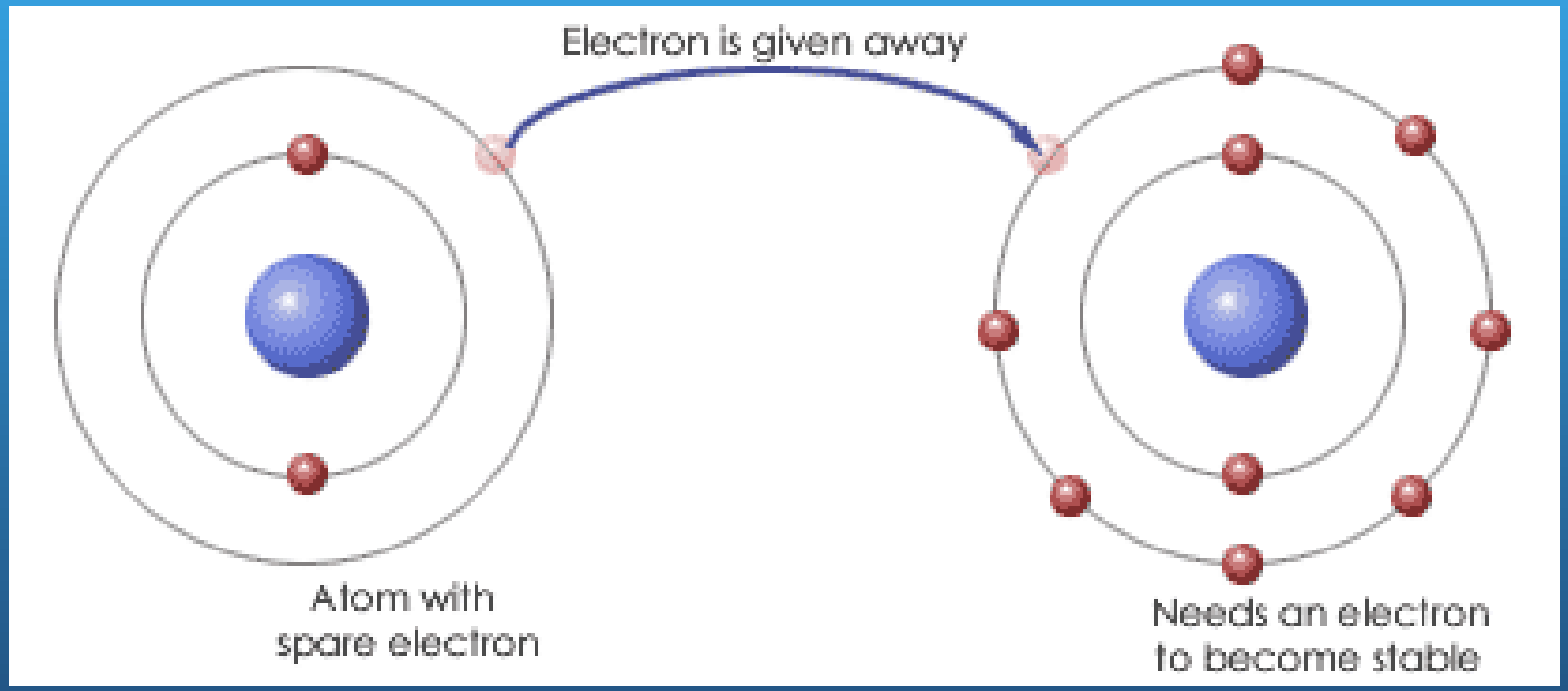
- Elements that have seven electrons will gain another single electron to reach Group VIII

Bonding between elements

- We bond different elements to one another in one of two ways.
- When we combine a metal and a non-metal together, we consider this to be an IONIC BOND
- IONIC BOND – The electrons from the metal will donate themselves to the missing electrons and form bonds that are not shared but “stolen”

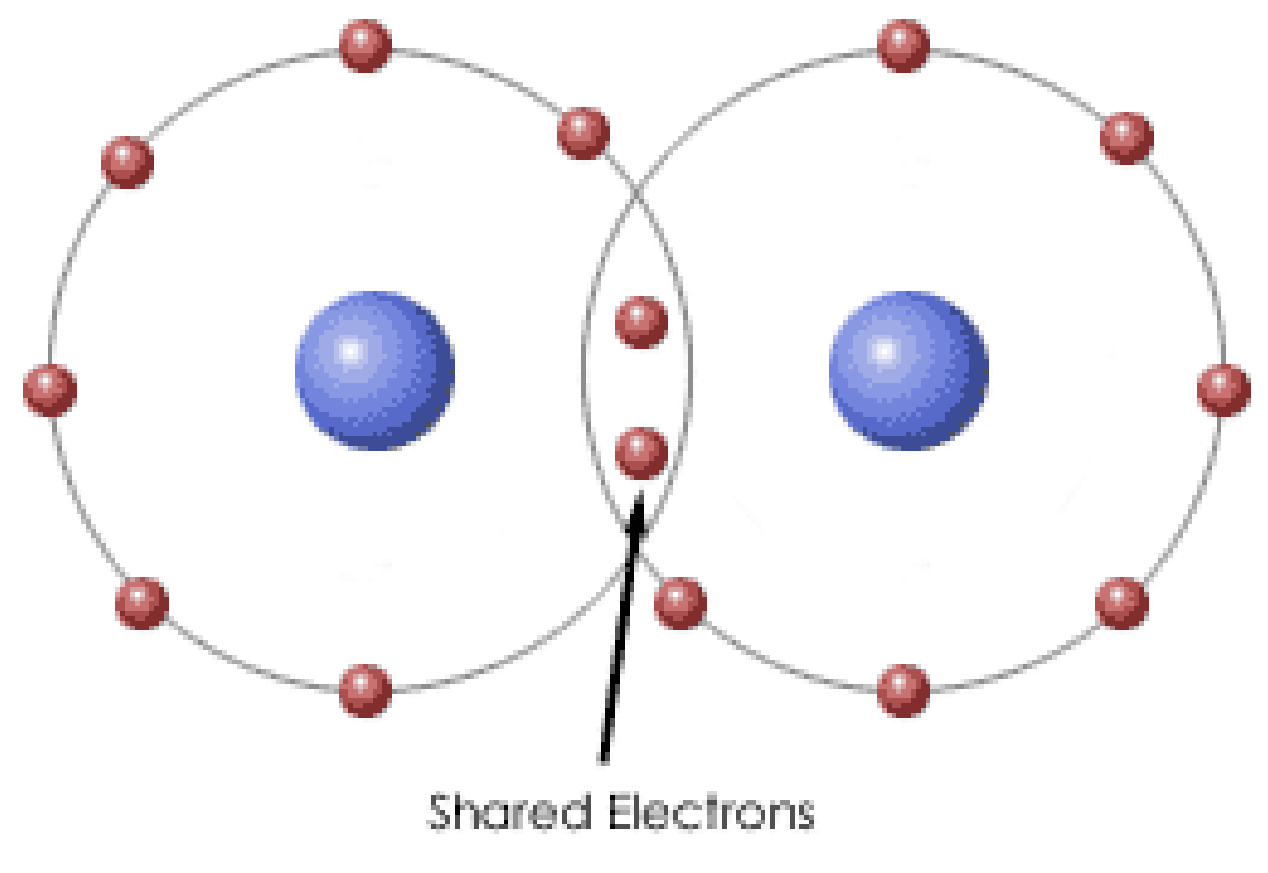
IONIC BONDING



Bonding between elements

- We bond different elements to one another in one of two ways.
- When we combine a non-metal and a non-metal together, we consider this to be an COVALENT BOND
- COVALENT BOND – The electrons from the non metal will be shared with the other non-metal and form bonds that are shared.

COVALENT BONDING



Ions- What the heck are they?

- When an atom has an equal number of protons and electrons, they are known to be neutral
- When an atom has a different number of electrons from protons, the atom will no longer be neutral.
- It will now have a charge, either negative or positive, depending on whether the atom gained or lost electrons
- When they have a charge, they are now known as IONS!

Positive ions- Where they come from

- As we have studied in the past, electrons are known to have a negative charge.
- If the atom loses an electron, it will therefore have more protons than electrons.
- The new ion will now have an overall charge of positive
- Take for example the element Sodium, Na. Since Na tends to lose an electron, it will have 11 protons (+) and 10 electrons (-)
- It's overall charge will be +1. 11 (+) – 10 (-) = +1, written Na^+

Negative ions- Where they come from

- As we have studied in the past, electrons are known to have a negative charge.
- If the atom gains an electron, it will therefore have more electrons than protons.
- The new ion will now have an overall charge of negative.
- Take, for example, the element Chlorine, Cl. Since Cl tends to gain an electron, it will have 17 protons (+) and 18 electrons (-)
- It's overall charge will be -1. 17 (+) – 18 (-) = -1, written Cl^-

Crossover Rule- Switching numbers

- If we wanted to combine two elements together, we have to look at their charges.
- We take the number of charges and cross them from one side to another.
- Let's take for example magnesium, Mg and chlorine, Cl
- Mg will likely lose 2 e-, and Cl will likely gain 1 e-.
- Mg^{2+} and Cl^{-} will become $Mg^{2+}Cl^{-}$, $MgCl_2$