

What is an Ion?

- When an atom of 1 element reacts with another atom of a second element they will "bond" together
- when elements react they are trying to fill their valence shell
- by filling their shell, they will become stable.
- only the valence electrons are involved in bonding. the inner electrons &

nucleus are not involved.

- elements try to fill their valence shell in 1 of 2 ways

1. by losing valence electrons (metals)

2. by gaining valence electrons (non-metals)

3. by sharing valence electrons

- when an atom gains or loses an electron it results in the atom having more or less electrons than

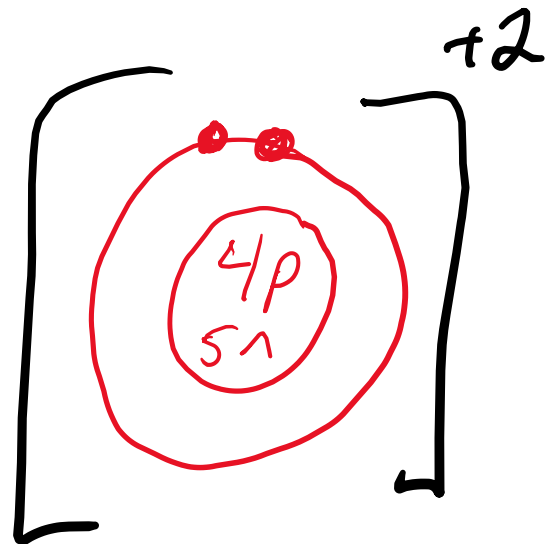
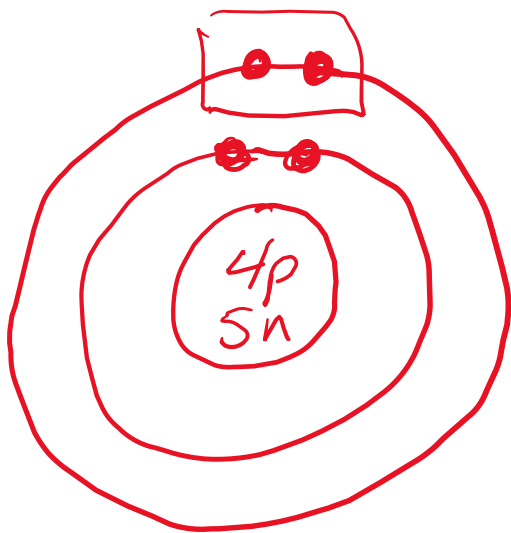
protons.

- when this happens the atom is now called an "ion" and will have an ion charge.

This means the net charge is no longer zero because $\#p \neq \#e$

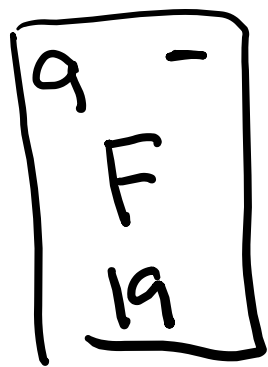
- metals always lose valence electrons and form positive ions

	Atom	Ion
$\begin{array}{cc} 4 & +2 \\ \text{Be} & \\ 9 & \end{array}$	$4p + 4e$ $+4 + -4$ ○ net charge	$4p + 2e$ $+4 + -2$ $+2 \text{ net charge}$



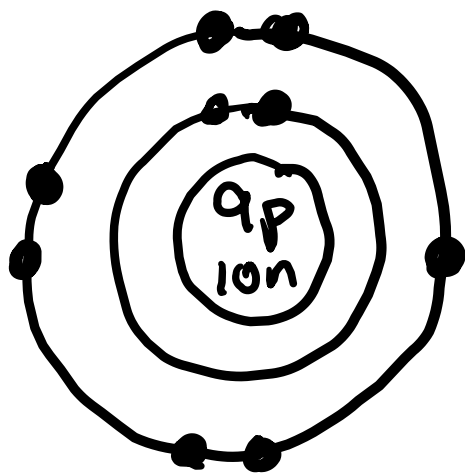
Rule: Square brackets + ion charge

• non-metals always
gain valence electrons
 to form negative ions



$$\begin{aligned}
 &9p + 9e \\
 &9(+1) + 9(-1) \\
 &+9 + -9
 \end{aligned}$$

○ net charge



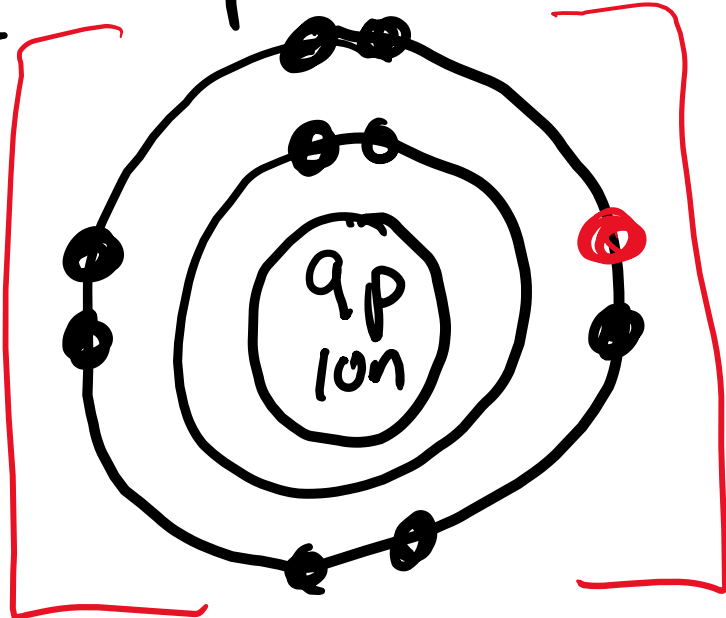
Atom

Ion

$$9p + 10e$$

$$9 + -10$$

-1 net charge



* metals always
lose electrons

* non-metals always
gain electrons

