

Periodic Table Part 2

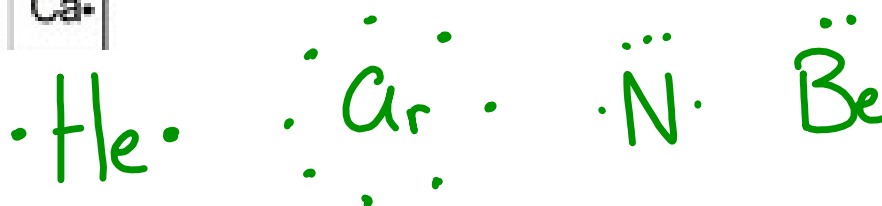
Lewis Notation

- Dots are used to show the number of valence electrons an element has.
- All elements in the same group have the same Lewis notation.
- Dots are put in the 4 compass points (N, E, S and W).
- You cannot double up on a compass point until each point has a dot. **No compass points should have more than 2 dots.**

1 Label the Periods down the left side of the table.
2 Label the Groups across the top of the table. (Note: Transition Metals are not included)

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8
Period 1	H							He
Period 2	Li	Be	B	C	N	O	F	Ne
Period 3	Na	Mg	Al	Si	P	S	Cl	Ar
Period 4	K	Ca						

Incorrect:



Ions

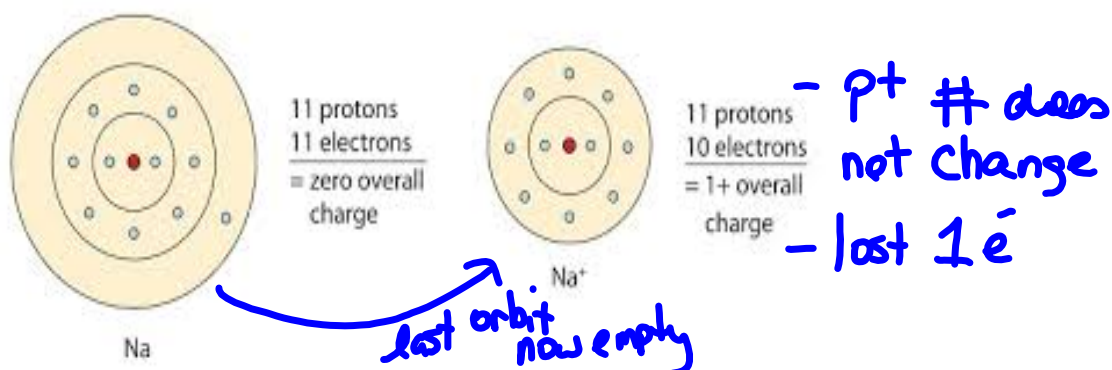
Def: Are charged atoms.

the atoms will be positively or negatively charged.

the atoms become charged by **gaining or losing electrons.**

all elements in the same family have the same ion charge.

When an element donates or accepts electrons they will form a compound and become stable.



<https://www.youtube.com/watch?v=x4loMrlths0>

Metals:

- Groups 1, 2 and 3 on the periodic table.

Metals donate electrons to non-metals to form positive ions.

Group 1	Group 2	Group 3
Li	Be	
$(3p) \uparrow \uparrow = 3p^+ 3e^-$ 2e ⁻ Neutral + unstable $(3p) \uparrow \uparrow \times = 3p^+ 2e^-$ 2 1 ^{NM} charged + but stable	$(4p) \uparrow \uparrow = 4p^+ 4e^-$ 2e ⁻ 2e ⁻ Neutral + unstable $(4p) \uparrow \uparrow \times = 4p^+ 2e^-$ 2e ⁻ 2e ⁻ ^{NM} charged + stable	
Na	Mg	Al
$(11p) \uparrow \uparrow \uparrow = 11p^+ 11e^-$ 2e ⁻ 8e ⁻ Neutral + unstable $(11p) \uparrow \uparrow \uparrow \times = 11p^+ 10e^-$ 2e ⁻ 8e ⁻ 1e ⁻ ^{NM} charged + stable	$(12p) \uparrow \uparrow \uparrow = 12p^+ 12e^-$ 2e ⁻ 8e ⁻ 2e ⁻ Neutral + unstable $(12p) \uparrow \uparrow \uparrow \times = 12p^+ 10e^-$ 2e ⁻ 8e ⁻ 2e ⁻ ^{NM} charged + stable	$(13p) \uparrow \uparrow \uparrow = 13p^+ 13e^-$ 2e ⁻ 8e ⁻ 3e ⁻ Neutral + unst. $(13p) \uparrow \uparrow \uparrow \times = 13p^+ 12e^-$ 2e ⁻ 8e ⁻ 2e ⁻ ^{NM} charged + stable
Charge? +1	+2	+3
Why? loses 1e ⁻ ∴ has 1 extra p ⁺ = +1	loses 2e ⁻ ∴ has 2 extra p ⁺ = +2	loses 3e ⁻ ∴ has 3 extra p ⁺ = +3

Why do metals within the same group have the same charge?

Because they have the same amount of ve which will be donated to a non-metal.

Non-Metals:

- Groups 4-8

Non-metals accept electrons from metals and form negative ions.

Group 4	Group 5	Group 6	Group 7
$(14p) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 4 \end{matrix} = 14p^4$ $14e^-$ $(14p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 4 \end{matrix} = 14p^+$ $14e^-$	$(15p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 5 \end{matrix} = 15p^+$ $15e^-$ $(15p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 5 \end{matrix} = 15p^+$ $15e^-$	$(16p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 6 \end{matrix} = 16p^+$ $16e^-$ $(16p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 6 \end{matrix} = 16p^+$ $16e^-$	$(17p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 7 \end{matrix} = 17p^+$ $17e^-$ $(17p^+) \begin{matrix} \uparrow \uparrow \uparrow \\ 2 & 8 & 7 \end{matrix} = 17p^+$ $17e^-$
Charge? -4	-3	-2	-1
Why? gained 4e⁻ to fill orbit to 8e⁻	gained 3e⁻ to fill orbit to 8e⁻	gained 2e⁻ to fill orbit to 8e⁻	gained 1e⁻ to fill orbit to 8e⁻

Why do non-metals within the same group form the same charge?

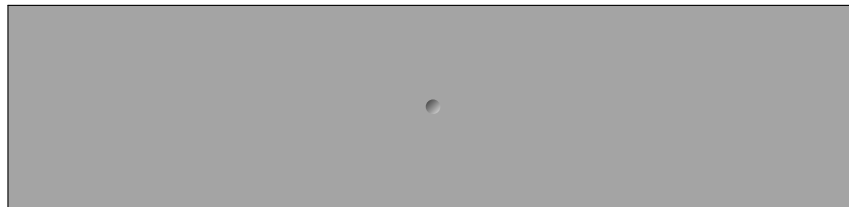
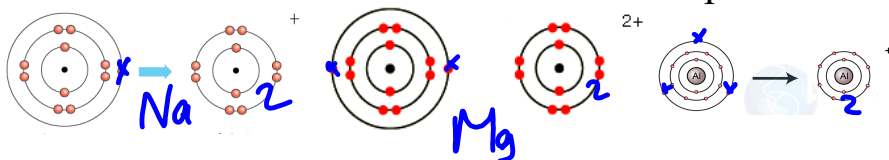
Because they have the same amount of ve and need the same amount of electrons to fill in the orbit to 8

Group 8- ion?

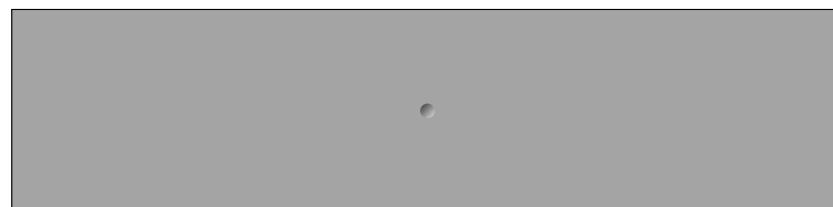
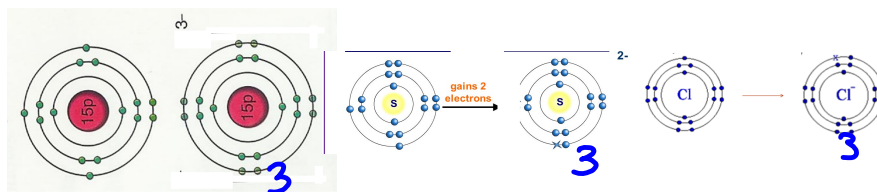
They do not form an ion because their orbits are full and are therefore already a stable atom.

+1									-1	0
IA		+2							VIIA	VIIIA
1 H		IIA							1 F	2 Ne
3 Li		4 Be							9 F	10 Ne

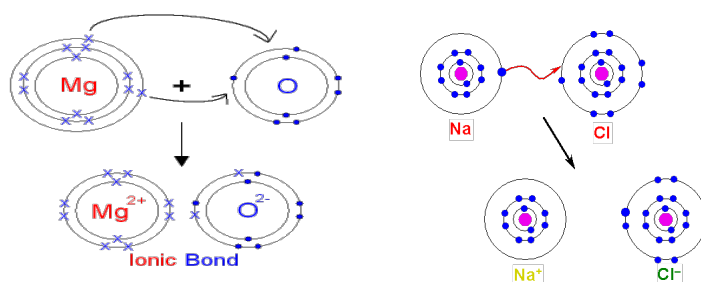
Below are the ions formed for metals in period 3.



Below are ions formed for non-metals in period 3.



Compounds formed when metals donate and non-metals accept electrons = stable compound.



Past exam questions

1. Which atom is correctly represented with the Lewis notation?



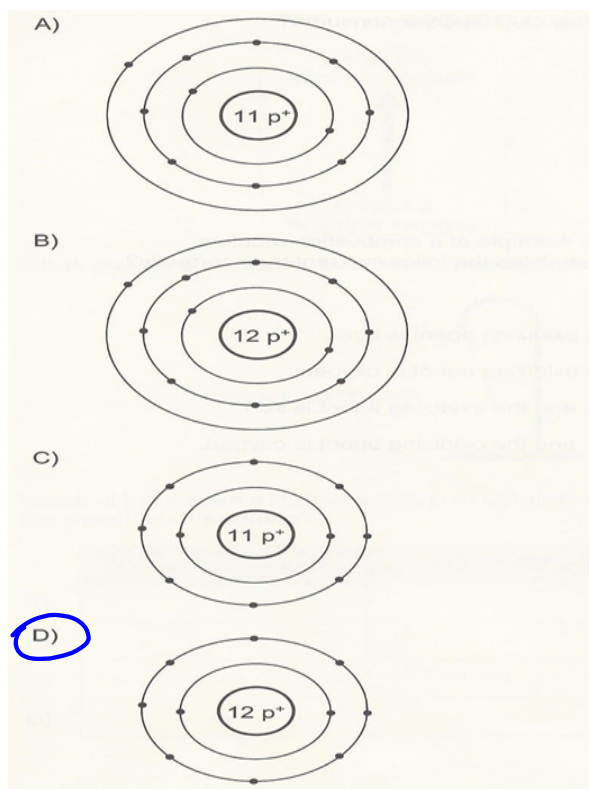
2. During ionization, an atom can become a positive ion. How does an atom become a positive ion?

- A) It gains one or more electrons
- B) It loses one or more electrons**
- C) It gains one or more protons
- D) It loses one or more protons

3. If a fluorine (F) atom becomes a negative ion, what will be the distribution of the charges carried by this ion?

- A) 8 positive charges and 9 negative charges
- B) 9 positive charges and 8 negative charges
- C) 9 positive charges and 10 negative charges**
- D) 10 positive charges and 9 negative charges

4. Which diagram correctly represents the Rutherford-Bohr model for a **positive** magnesium ion?



Atoms form ions (Chemistry) - Binogi.mp4