

Science 9
Unit 2: Chemical Reactions
Worksheet 12: IONS



ION – refers to an atom that loses or gains electrons.

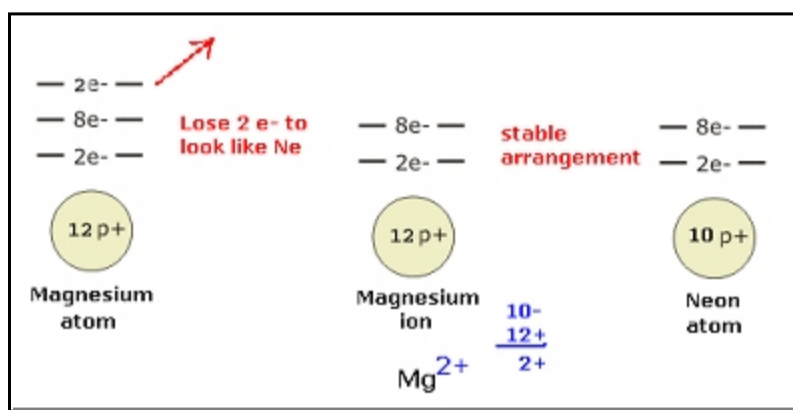


Electrons are lost or gained so that the valance shell is filled. The valance shell is filled to make the atom more stable like the noble gases

There are two types of ions:

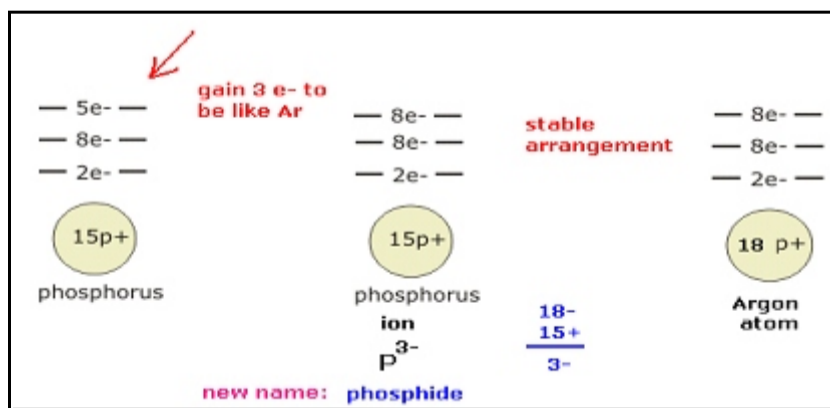
1) Cation

- Metal atoms that lose electrons to become positive. (clue: the t in cation resembles a + sign).



2) Anion

- Non-metal atoms that gains electrons to become more negative. An anion is A Negative ION (A N ion)



PART A: MULTIPLE CHOICE

- Which of the following is true for an ion?
 - An atom that gains electrons
 - An atom that loses electrons
 - It has its valance shell filled
 - All are correct
- Why are ions formed?
 - To make the atom explode
 - To ensure that the valance shell is not filled
 - To make the atom more stable like a noble gas
 - To keep the number of protons equal to the number of electrons
- An atom that gains an electron
 - becomes a cation.
 - becomes a different isotope of the same element.
 - has a different atomic number.
 - becomes an anion.
- An atom that loses an electron
 - becomes a cation.
 - becomes a different isotope of the same element.
 - has a different atomic number.
 - becomes an anion.
- Metals tend to _____ electrons and nonmetals tend to _____ electrons.
 - gain, gain
 - lose, lose
 - lose, gain
 - gain, gain
- Anions tend to be _____ and cations tend to be _____.
 - metals, metals
 - nonmetals, nonmetals
 - metals, nonmetals
 - nonmetals, metals
- Anions tend to have a _____ charge and cations tend to have a _____ charge.
 - positive, positive
 - negative, negative
 - positive, negative
 - negative, positive
- Ions in the same group like to have _____ charge.
 - the same
 - a different
 - a neutral
 - no

9. A calcium ion (Ca^{2+}) has
- (A) lost two electrons.
 - (B) gained two electrons.
 - (C) gained two protons.
 - (D) lost two protons.
10. An atom becomes an ion with a charge of $2+$ when it:
- (A) Gains 2 electrons
 - (B) Loses 2 electrons
 - (C) Gains 2 protons
 - (D) Loses 2 protons
11. typically form ions with a $2+$ charge.
- (A) Alkaline earth metals
 - (B) Halogens
 - (C) Chalcogens
 - (D) Alkali metals
12. Sodium forms an ion with a charge of _____.
- (A) $1+$
 - (B) $1-$
 - (C) $2+$
 - (D) $2-$
13. Aluminum forms an ion with a charge of _____.
- (A) $2+$
 - (B) $1-$
 - (C) $3+$
 - (D) $2-$
14. Calcium forms an ion with a charge of _____.
- (A) $1-$
 - (B) $2-$
 - (C) $1+$
 - (D) $2+$
15. Fluorine forms an ion with a charge of _____.
- (A) $1-$
 - (B) $1+$
 - (C) $2-$
 - (D) $2+$
16. Iodine forms an ion with a charge of _____.
- (A) $1-$
 - (B) $1+$
 - (C) $2-$
 - (D) $2+$
17. Oxygen forms an ion with a charge of _____.
- (A) $2-$
 - (B) $2+$
 - (C) $3-$
 - (D) $3+$

18. What type of ions have names ending in -ide?
- (A) only metal ions
 (B) only cations
 (C) only gaseous ions
 (D) only anions
19. How many electrons does the Al^{3+} ion possess?
- (A) 16
 (B) 10
 (C) 6
 (D) 13
20. How many valence electrons are in a sodium ion?
- (A) 0
 (B) 1
 (C) 2
 (D) 8

PART B: WRITTEN RESPONSE

1. Write the symbols and charges for the atoms given below and then identify it as anion/cation and metal/nonmetal.

ELEMENT	SYMBOL AND CHARGE	METAL OR NONMETAL?	ANION OR CATION?
Calcium	Ca^{+2}	Metal	Cation
Bromine	Br^{-1}	Nonmetal	Anion
Lithium			
Magnesium			
Nitrogen			
Oxygen			
Beryllium			
Chlorine			
Aluminum			
Phosphorous			

2. Draw a Bohr Model for the following:

(A) Magnesium Atom	(B) Magnesium Ion	(C) Neon Atom
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