

POGIL 2 Ions

How are ions made from neutral atoms?

You have learned that not all atoms of an element are the same. Variation in the number of neutrons results in different isotopes of the element. In this activity we will explore another variation that can take place—the loss and gain of electrons. The exchange of electrons between atoms is a very common way for chemical change to take place. We will see it many times throughout the year.

1. Use Diagram 1 on the next page to complete the following table.

	Metal or Nonmetal	Number of protons in the atom	Number of protons in the ion	Number of neutrons in the atom	Number of neutrons in the ion	Number of electrons in the atom	Number of electrons in the ion	Charge on the ion
Lithium	metal	3	3	4	4	3	2	1+
Magnesium	<i>Metal</i>	12	12	12	12	12	10	2+
Aluminum	<i>Metalloid</i>	13	13	14	14	13	10	3+
Fluorine	<i>Non metal</i>	9	9	10	10	9	10	1-
Oxygen	nonmetal	8	8	8	8	8	10	2-
Nitrogen	<i>Non metal</i>	7	7	7	7	7	10	3-

2. Based on the table you completed in Question 1, what distinguishes a neutral atom from an ion?

A neutral atom has the same number of protons and electrons (no charge). An ion has a charge (# of protons does not equal # of electrons).

3. Examine the isotope symbols in Diagram 1.

- a. Where is the ion charge located in the isotope symbol?

Top right corner

- b. Is a charge indicated on the neutral atoms? If yes, where is it located?

No

4. Which subatomic particle carries a positive charge?

Protons are positive

5. Which subatomic particle carries a negative charge?

Electrons are negative

6. Propose a mathematical equation to calculate the charge on an ion from the number of protons and electrons in an ion. Confirm that your equation works using two positive ion examples and two negative ion examples from Diagram 1.

The charge of an ion = # of protons - # of electrons

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