

STUDENT WORKSHEET

Ionic Bonding

Learning Objectives:

- Students demonstrate faith by praying before starting their learning process.
- Students show teamwork in discussing ionic bonding.
- Students can identify, propose ideas, and communicate discussion results based on the information obtained.
- Through group discussions, students can accurately explain the bonding in a compound.

Group Members:

- 1.
- 2.
- 3.
- 4.
- 5.



Problem Orientation

Have you ever seen table salt? Of course, you have...

Table salt is an essential ingredient in cooking, to the point that there is a saying: "*Like vegetables without salt,*" which describes a situation that is incomplete due to the absence of an important element.

If table salt is so familiar in daily life, do you know what elements make up table salt?



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That's right! Table salt (NaCl) consists of sodium (Na) and chlorine (Cl). Sodium is a metal, and chlorine is a nonmetal, each with hazardous properties in their elemental forms. However, when sodium and chlorine combine, they form a compound that is safe to consume and widely used in daily life. This happens because sodium and chlorine interact to form a strong chemical bond. The crystalline structure of table salt results from the ionic bonds between sodium and chloride ions, forming the chemical compound sodium chloride (NaCl).



Question:

Based on the information above, what problem can you identify regarding the formation of the chemical bond in NaCl? Express your problem in the form of a question.

A large, empty rounded rectangular box with a green border, intended for the student to write their question.



Guiding Investigation Table

No	Chemical Element	Atomic Number	Electron Configuration	Valence Electrons	Electron Transfer (Gain/Loss)	New Electron Configuration	Valence Electron Stability	Formed Ion
1	Na (Sodium)	11	$1s^2 2s^2 2p^6 3s^1$	1	Loses 1 electron	$1s^2 2s^2 2p^6$	8	Na^+
2	Cl (Chlorine)	17	$1s^2 2s^2 2p^6 3s^2 3p^5$	7	Gains 1 electron	$1s^2 2s^2 2p^6 3s^2 3p^6$	8	Cl^-
3	Mg (Magnesium)							
4	Ca (Calcium)							
5	O (Oxygen)							

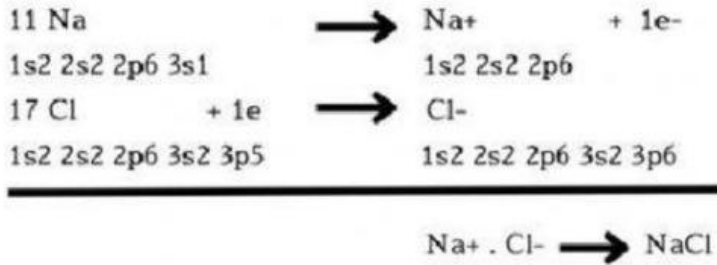
Instructions:

- Complete the missing information for Magnesium (Mg), Oxygen (O) and Calcium (Ca).
- Use your knowledge of electron configuration and ionic bonding to determine the correct values.
- Explain how each element achieves a stable electron configuration.
- Discuss how the transfer of electrons leads to the formation of ionic compounds.



Developing Results

Formation of Ionic Bonds in NaCl



Questions

Based on the collected data, answer the following questions:

1. Why does the Na atom lose one electron to form the Na^+ ion? (Relate to the nearest noble gas electron configuration)

Answer:

2. Why does the Cl atom gain one electron to form the Cl^- ion? (Relate to the nearest noble gas electron configuration)

Answer:



3. What happens when the positively charged Na ion and the negatively charged Cl ion come close together?

Answer:



Magnesium and Oxygen Reactions

1. How can the Mg atom achieve a noble gas configuration?

Answer:

2. Based on the previous question, what species is formed from the Mg atom?

Answer:



3. How can the O atom achieve a noble gas configuration?

Answer:

I've studied all day
and night for this



4. What species is formed from the O atom?

Answer:

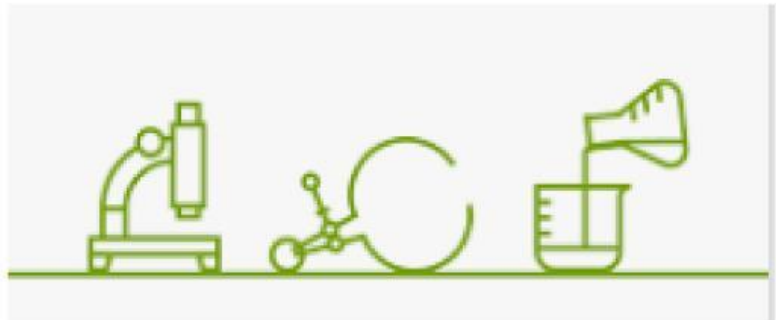
5. What happens when the positively charged Mg ion and the negatively charged O ion come close together?

Answer:



6. The bonds in NaCl, MgO, and CaCl₂ are all ionic bonds. So, in your own words, what do you understand by "ionic bond"?

Answer:



Analysis and Evaluation

Based on the questions asked earlier and the hypothesis you have written, try to verify whether your hypothesis was correct.



- Was your hypothesis correct?
- If yes, write down the reason.
- If not, provide an explanation for the inaccuracy.

Write down the conclusions from today's lesson.



*Thank
You*