



High School Science Virtual Learning

Chemistry

Ionic Bonding

May 19, 2020



High School Chemistry

Lesson: [5/19/20]

Objectives/Learning Targets:

Students will be able to explain ionic bonding.



Let's Get Started:

3.00 moles of N_2 and 4.00 moles of O_2 are placed in a 50.0 L container at a temperature of 27.0°C .

1. What are the partial pressures (kPa) of N_2 and O_2 ?
2. What will the pressure (kPa) of the resulting mixture of gases be?

Let's Get Started: Answer Key

1. $PV = nRT$ so... $P = (nRT)/V$

$$P = (3.00\text{mol} \times 8.31 \text{ (L} \cdot \text{kPa)} / (\text{mol} \cdot \text{K}) \times 300\text{K}) / 50.0 \text{ L}$$
$$= 150 \text{ kPa}$$

$$P = (4.00\text{mol} \times 8.31 \text{ (L} \cdot \text{kPa)} / (\text{mol} \cdot \text{K}) \times 300\text{K}) / 50.0 \text{ L}$$
$$= 199 \text{ kPa}$$

2. $P_{\text{tot}} = P_{\text{N}_2} + P_{\text{O}_2}$

$$= 150 \text{ kPa} + 199 \text{ kPa} = 349 \text{ kPa}$$



Lesson Activity:

Directions:

1. Read through and write down the important information in the following slides.

Notes:

- An ionic compound is a compound composed of cations and anions.
 - Cations - atom or group of atoms that have collectively lost electron(s); essentially positively charged
 - Generally metals
 - One exception is the ammonium ion (NH_4^+) made up of a nitrogen and 4 hydrogen atoms
 - Anions - atom or group of atoms that have collectively gained electron(s); essentially negatively charged
 - Generally non metals

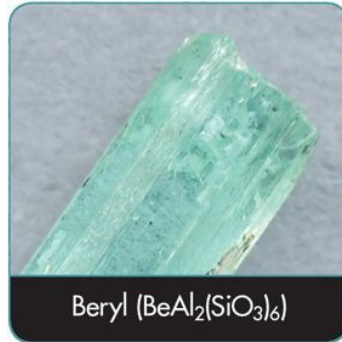
Notes:

- Although they are composed of ions, ionic compounds are electrically neutral.
 - Anions and cations have opposite charges and attract one another by means of electrostatic forces.
 - The electrostatic forces that hold ions together in ionic compounds are called **ionic bonds**.

Notes:

- Properties of Ionic Compounds

- Most are crystalline solids at room temperature
- Have relatively high melting points and boiling points
- Can only conduct electricity when dissolved in water or molten



Notes:

- Writing Formulas for Ionic Compounds
 - To write the formula of a binary ionic compound, first write the symbol of the cation and then the anion. Then add subscripts as needed to balance the charges.
 - A binary compound is composed of two elements.
 - For example, the ionic compound potassium chloride is composed of potassium cations (K^+) and chloride anions (Cl^-), so potassium chloride is a binary ionic compound.
 - The charge of each K^+ cation is balanced by the charge of each Cl^- anion.
 - The ions combine in a 1:1 ratio, so the formula for potassium chloride is KCl.



Lesson Activity:

Directions:

1. Take notes as you watch the following video.

Links:

- Video: [Ionic Bonding Introduction](#)



Practice

Complete the following questions using the information you learned during the lesson activity.



Questions: Write the formulas for the following compounds:

1. Sodium phosphide
2. Magnesium nitrate
3. Lead (II) sulfite
4. Calcium phosphate
5. Ammonium sulfate
6. Copper (II) chloride
7. Manganese (IV) nitride
8. Potassium permanganate
9. Tin (II) sulfite
10. Vanadium (V) fluoride

Once you have completed the practice questions check with the **answer** key.

1. Na_3P
2. $\text{Mg}(\text{NO}_3)_2$
3. PbSO_3
4. $\text{Ca}_3(\text{PO}_4)_2$
5. $(\text{NH}_4)_2\text{SO}_4$
6. CuCl_2
7. Mn_3N_4
8. KMnO_4
9. SnSO_3
10. VF_5

More Practice:

Follow the links below to do more practice.

1. [Ionic Compound Practice](#)
2. [Ionic Compound Formula Writing](#)



Additional Practice:
Click on the link below for additional practice.

[Quiz](#)