

Topic 5- Radicals/Polyatomic Ions

Examples of Common Polyatomic Ions

Name	Chemical Formula
Nitrate	NO_3^-
Chromate	CrO_4^{2-}
Carbonate	CO_3^{2-}
Chlorate	ClO_3^-
Hydroxide	OH^-
Phosphate	PO_4^{3-}
Sulphate	SO_4^{2-}

1. Write all the possible molecular formulas and names of the molecules formed when each of the metals bond with each of the radicals.

K	Mg	Al	SO_4^{2-}	PO_4^{3-}
Formula			Name	
K_2SO_4			Potassium sulphate	
K_3PO_4			Potassium phosphate	
MgSO_4			Magnesium sulphate	
$\text{Mg}_3(\text{PO}_4)_2$			Magnesium phospahte	
$\text{Al}_2(\text{SO}_4)_3$			Aluminum sulphate	
AlPO_4			Aluminum phosphate	

2. The following molecules are incorrectly bonded. Re-write the bond correctly.

Molecule	Correction
$\text{Li}(\text{OH})_2$	LiOH
K_2NO_3	KNO_3
Ca_2CrO_4	CaC_2O_4
Be_3PO_4	$\text{Be}_3(\text{PO}_4)_2$
Al_3NO_3	$\text{Al}(\text{NO}_3)_3$
$\text{B}(\text{PO}_4)_3$	BPO_4

3. Determine which bonds are incorrect and re-write them correctly

AlOH	Mg(OH) ₂	KNO ₃	Na(CO ₃) ₂
Al(OH) ₃	Correct	Correct	Na ₂ CO ₃

4. The following are all correctly bonded. What is the charge of each radical?

Mg(NO ₃) ₂	AlPO ₄	Al ₂ (CrO ₄) ₃	KOH
-1	-3	-2	-1

5. Write the correct molecular formula for each bond

Aluminum sulphate	Potassium nitrate	Magnesium phpsohate
Al ₂ (SO ₄) ₃	KNO ₃	Mg ₃ (PO ₄) ₂
Calcium chlorate	Sodium carbonate	Lithium chromate
Ca(ClO ₃) ₂	Na ₂ CO ₃	Li ₂ CrO ₄

6. Among the following chemical formulas, which contains s radical with a -3 charge?

- A) (NH₄)₂SO₄ B) Ca₃(PO₄)₂ C) NaNO₃ D) MgCO₃

Answer: B

7. Which of the following is the correct formula for the compound aluminum cation and anion Cr₂O₇²⁻?

- A) AlCr₂O₇ B) Al₃(Cr₂O₇)₂ C) Al₂Cr₂O₇ D) Al₂(Cr₂O₇)₃

Answer: B

8. The molecular formula for magnesium chromate is MgCrO₄. In this formula, what is the charge of the polyatomic ion cromate CrO₄?

- A) 1+ B) 1- C) 2+ D) 2-

Answer: D

9. Given that the radical AsO₄ has charge of 3⁻, determine with the help of the periodic table, the formula of the compound resulting from its combination with magnesium.

- A) MgAsO₄ B) Mg₃(AsO₄)₂ C) Mg₃AsO₄ D) Mg(AsO₄)₃

Answer: B

10. Beryllium phosphide is a semiconductor used in laser diodes. What is the chemical formula for beryllium phosphide?

- A) Be₃(PO₄)₂ B) BePO₄ C) Be₂P₃ D) Be₃P₂

Answer: A