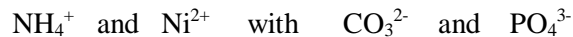


ANSWERS TO "TRY YOURSELF" PROBLEMS FROM STUDY SECTION 2.5

Try Yourself 2.5

Write formulas for all the ionic compounds that can be formed by combining the following ions:



Answer:

$(\text{NH}_4)_2\text{CO}_3$ Ammoniumkarbonaat. / *Ammonium carbonate.*

$(\text{NH}_4)_3\text{PO}_3$ Ammoniumfosfaat. / *Ammonium phosphate.*

NiCO_3 Nikkel(II)karbonaat. / *Nickel(II) carbonate.*

$\text{Ni}_3(\text{PO}_4)_2$ Nikkel(II)fosfaat. / *Nickel(II) phosphate*

Try Yourself 2.6

Which compound formula and name in the list is NOT correct?

1. CaSO_4 , calcium sulfate
2. NaNO_3 , sodium nitrate
3. MgI_2 , magnesium iodide
4. NH_4PO_4 , ammonium phosphate
5. $\text{Ca}(\text{ClO})_2$, calcium hypochlorite

Answers:

1. CaSO_4 , calcium sulfate (Correct)

2. NaNO_3 , sodium nitrate (Correct)

3. MgI_2 , magnesium iodide (Correct)

4. NH_4PO_4 , ammonium phosphate (Incorrect, should be $(\text{NH}_4)_3\text{PO}_4$)

5. $\text{Ca}(\text{ClO})_2$, calcium hypochlorite (Correct)

Try Yourself 2.7

Sodium oxalate has the formula $\text{Na}_2\text{C}_2\text{O}_4$. Based on this information, what is the formula for iron(III) oxalate?

1. FeC_2O_4 2. $\text{Fe}(\text{C}_2\text{O}_4)_2$ 3. $\text{Fe}(\text{C}_2\text{O}_4)_3$ 4. $\text{Fe}_2(\text{C}_2\text{O}_4)_3$ 5. $\text{Fe}_3(\text{C}_2\text{O}_4)_2$

Answer:

Fe^{3+} and $\text{C}_2\text{O}_4^{2-}$ will give $\text{Fe}_2(\text{C}_2\text{O}_4)_3$

Option number 4 is correct.

Try Yourself 2.8

Which of the following are correct formulas for compounds? For those that are not, give the correct formula.

- a) AlCl b) NaF_2 c) Ga_2O_3 d) MgS
e) CaO f) SrCl_2 g) $\text{Fe}_2\text{O}_3 / \text{FeO}$ h) K_2O

Answer:

- a) AlCl Incorrect, Al^{3+} and Cl^- will give AlCl_3 (Aluminiumchloried. / *Aluminium chloride.*)
b) NaF_2 Incorrect, Na^+ and F^- will give NaF (natriumfluoried. / *sodium fluoride.*)
c) Ga_2O_3 Correct.
d) MgS Correct.
e) CaO Correct.
f) SrCl_2 Correct.
g) $\text{Fe}_2\text{O}_3 / \text{FeO}$ Both are correct.
h) K_2O Correct.

Try Yourself 2.9

Which one of the following two ionic compounds melting point will be higher? Explain your answer.

NaCl and RbI

Answer:

Applying Coulombs Law regarding the direct proportionality of the product of the charges:

Na and Rb are both group 1 metals, so both will have a +1 charge.

Cl and I are both group 7 non-metals, so both will have a -1 charge.

Conclusion:

We cannot deduce from the charges which ionic compound will have the higher melting point.

Applying Coulombs Law regarding the inverse proportionality to the square root of the distance between the ions:

Na has an atomic number of 11 and chlorine has an atomic number of 17. When you compare this with Rb which has an atomic number of 37 and I which has an atomic number of 53 you should be able to deduce that Rb and I are much larger atoms/ions than Na and Cl.

Rb and I have much more protons and neutrons in their nuclei and therefore more electrons making them larger entities. Therefore, they will have a larger distance between their nuclei – meaning that the larger the distance, the weaker the electrostatic force keeping the two ions together.

Na and Cl are smaller entities and therefore the distance between their nuclei will be smaller, making the electrostatic attraction stronger.

Conclusion:

NaCl will have a higher melting point.

This is true when you lookup the meltingpoints of the two compounds: NaCl = 801 °C and RbI = 642 °C.