1) Write the balanced equation for the reaction that occurs when iron (II) chloride is mixed with sodium phosphate forming iron (II) phosphate and sodium chloride.

2) If 23 grams of iron (II) chloride reacts with 41 grams of sodium phosphate, what is the limiting reagent? How much sodium chloride can be formed?

3) How much of the excess reagent remains when this reaction has gone to completion?

4) If 16.1 grams of sodium chloride are formed in the reaction, what is the percent yield of this reaction?

Solutions

1) Write the balanced equation for the reaction that occurs when iron (II) chloride is mixed with sodium phosphate forming iron (II) phosphate and sodium chloride.

3 $FeCl_2$ + **2** Na_3PO_4 → $Fe_3(PO_4)_2$ + **6** $NaCl$
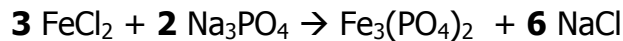
2) If 23 grams of iron (II) chloride reacts with 41 grams of sodium phosphate, what is the limiting reagent? How much sodium chloride can be formed?

23 g $FeCl_2$ x $\dfrac{1 \text{ mole } FeCl_2}{126.75 \text{ g } FeCl_2}$ x $\dfrac{2 \text{ mole } Na_3PO_4}{3 \text{ mole } FeCl_2}$ x $\dfrac{163.94 \text{ g } Na_3PO_4}{1 \text{ mole } Na_3PO_4}$ =

= 20. g Na_3PO_4 Since we have 41 g Na_3PO_4, $FeCl_2$ is the limiting reagent.

23 g $FeCl_2$ x $\dfrac{1 \text{ mole } FeCl_2}{126.75 \text{ g } FeCl_2}$ x $\dfrac{6 \text{ mole } NaCl}{3 \text{ mole } FeCl_2}$ x $\dfrac{58.44 \text{ g } NaCl}{1 \text{ mole } NaCl}$ =

= **21 g NaCl**

3) How much of the excess reagent remains when this reaction has gone to completion?

41 g Na_3PO_4 - 20. g Na_3PO_4 = **21 g Na₃PO₄**

4) If 16.1 grams of sodium chloride are formed in the reaction, what is the percent yield of this reaction?

$\dfrac{16.1 \text{ g } NaCl}{21 \text{ g } NaCl}$ x 100 = **77%**