

## Answer on Question #72284, Chemistry / General Chemistry

### Question:

A metal X forms two different chlorides if 12.70g of chloride A and 16.30g of chloride B contained 7.10g and 10.70g of chlorine respectively calculate the formulas of compounds and state the gravimetric law it will be in accordance with.

### Solution:

For the chloride A:

Amount of chlorine:  $7.10 / 35.45 = 0.2 \text{ mol}$

(Mass of metal X:  $12.70 - 7.10 = 5.6 \text{ g}$ )

Molecular weights of metal X for various stoichiometry:

1:1 -  $5.6 / 0.2 = 28 \text{ g/mol}$  (no rational matches)

1:2 -  $5.6 / 0.1 = 56 \text{ g/mol}$  (**Fe ??? Therefore - FeCl<sub>2</sub>**)

For the chloride B:

Amount of chlorine:  $10.70 / 35.45 = 0.3 \text{ mol}$

(Mass of metal X:  $16.30 - 10.70 = 5.6 \text{ g}$ )

Molecular weights of metal X for various stoichiometry:

1:1 -  $5.6 / 0.3 = 19 \text{ g/mol}$  (no rational matches)

1:2 -  $5.6 / 0.15 = 37 \text{ g/mol}$  (no rational matches)

1:3 -  $5.6 / 0.1 = 56 \text{ g/mol}$  (**Fe ??? Therefore - FeCl<sub>3</sub>**)

Taking into account both ways above - it must be Fe (iron)

### Answer:

FeCl<sub>2</sub> and FeCl<sub>3</sub>

(Gravimetric law was used to find the formulas)