Answer on Question #61807 - Chemistry | General Chemistry

A 26.99 gram sample of iron is heated in the presence of excess iodine. A metal iodide is formed with a mass of 149.7 g. Determine the empirical formula of the metal iodide.

Solution

m(Fe)=26.99 (g)

M(Fe) = 55.845 (g/mol)

$$n(Fe) = \frac{m}{M} = \frac{26.99 \text{ g}}{55.845 \text{ g/mol}} = 0.483 \text{ (mol)}$$

m(I) = 149.7 (g)

M(I) = 126.9 (g/mol)

$$n(I) = \frac{m_{(Fe_xI_y)} - m_{(Fe)}}{M} = \frac{149.7 - 26.99 \text{ g}}{126.9 \text{ g/mol}} = 0.966 \text{ (mol)}$$

The ratio between iron and iodine is 1:2. So, the empirical formula is therefore FeI_2.

Answer

The empirical formula is therefore FeI_2.