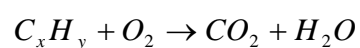


Question # 59835, Chemistry / General Chemistry | for completion

A 2.800g sample of an unknown compound that contains only carbon and hydrogen is burned in excess oxygen. The water vapour formed in the complete combustion reaction has a mass of 3.600g. In a separate experiment the molar mass of the unknown compound was determined to be 84.0 g/mol. Determine the empirical and molecular formula of the unknown compound.

Answer

2.8 g **3.6g**

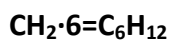


Mr **18 g/mol**

$$Mr(C_xH_y) = \frac{2.8 \cdot 18}{3.6} = 14 \text{ g/mol}$$

The simplest formula has molecular weight 14 g/mol and it is CH₂

$$n = \frac{Mr_{\text{(compound)}}}{Mr(CH_2)} = \frac{84}{14} = 6$$



Answer: The empirical formula of the unknown compound is **CH₂**, whereas molecular formula is **C₆H₁₂**.