Empirical & Molecular Formula

Chemistry

Working from percentage composition to a molecular formula.

From composition data to a molecular formula.

1. **Assume 100 g**
   Percentages become grams directly.
2. **Divide by relative atomic mass**
   Gives moles of each element.
3. **Divide by the smallest**
   Gives the simplest whole-number ratio.
4. **Multiply to clear fractions**
   1.5 becomes 3 by doubling everything.
5. **Scale to the molecular mass**
   Divide Mr by the empirical mass; multiply through.

40% C, 6.7% H, 53.3% O, MR 180

Moles: 3.33, 6.7, 3.33
Ratio 1:2:1 → CH_2O
Empirical mass 30; 180 ÷ 30 = 6
Molecular formula $C_6H_{12}O_6$

Benzene: empirical CH, molecular C_6H_6. The empirical formula alone cannot identify a compound.