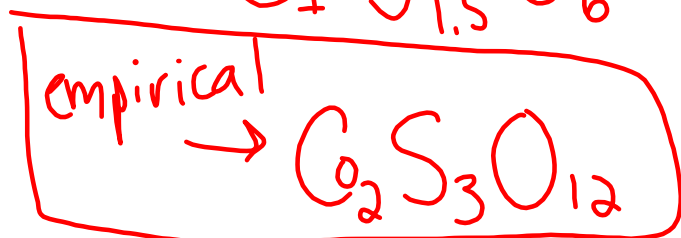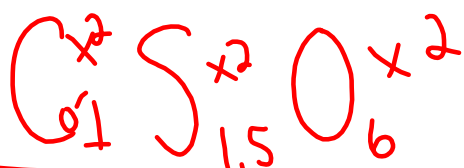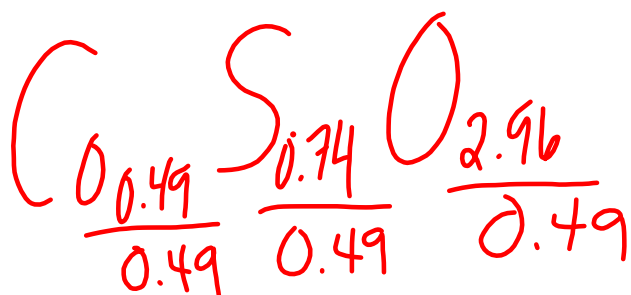# Warm Up

A compound is composed of 29.0% Co, 23.7% S and 47.3% O. The molecular molar mass of the compound is 406.04 g/mol. Determine the empirical and molecular formulas.

$$29 \, g \, Co \times \frac{1 \, mol}{58.93 \, g \, Co} = 0.49 \, mol$$

$$23.7 \, g \, S \times \frac{1 \, mol}{32.06 \, g \, S} = 0.74 \, mol$$

$$47.3 \, g \, O \times \frac{1 \, mol}{16 \, g \, O} = 2.96 \, mol$$

$$Co_{\frac{0.49}{0.49}} \, S_{\frac{0.74}{0.49}} \, O_{\frac{2.96}{0.49}}$$

$$Co_1^{\times 2} \, S_{1.5}^{\times 2} \, O_6^{\times 2}$$

empirical → $Co_2 S_3 O_{12}$

Molecular $\frac{406.04 \frac{g}{mol}}{406.04} = 1$

$$Co_2 S_3 O_{12}$$

Homework   #38-46

38. $C_2H_6O_2$

39. a) same b) different

40. Divide the mass of an element in the compound by the mass of the compound then multiply by 100.

41. The empirical formula gives the lowest whole-number ratio of atoms in the compound

42. The molecular formula of a compound is a simple whole-number multiple of the empirical formula.

43. 74.2% N 25.8% O

44. 25.3% Ca 30.4% C 3.8% H 40.5% O

46. a) molecular b) molecular c) both d) both

Test

-Moles - Representative particles

         - volume

         -molar mass(atomic mass)

- molar mass
 - Percent composition
- empirical formula and molecular formula

Molar Mass 6.02×10^{23}

Mass(g) $\longleftrightarrow$ Mole(mol) $\longleftrightarrow$ Particles

$\updownarrow$ 22.4L/mol@STP

Volume(L)