Answer on Question #39579 - Chemistry - Other

Question

How many moles of alcohol (C2H5OH) are there in 4.88 x 10^4 L? The density of alcohol is 0.79 g/mL.

Answer:

Mass of C_2H_5OH equals:

$$m = \rho V$$

ρ – Density of alcohol, ρ = 0.79 g/mL = 790 g/l.

V – Volume of alcohol, V = 4.88 x 10^4 L:

$$m = 790 \cdot 4.88 \cdot 10^4 = 3.8552 \cdot 10^7 \text{g}$$

Number of moles equals:

$$n = \frac{m}{M}$$

m – Mass of C_2H_5OH, g.

M – Molar mass of C_2H_5OH, equals:

$$M = 2M(C) + 6M(H) + M(O) = 2 \cdot 12 + 6 \cdot 1 + 16 = 46 \frac{g}{mole}$$

Then number of moles in 10.0 g of C_2H_5OH equals:

$$n = \frac{3.8552 \cdot 10^7}{46} = 838087\ moles = 8.4 \cdot 10^5\ moles$$

Answer: n = $8.4 \cdot 10^5$ moles.