

How many atoms are present in 1.65 of toluene? The density of toluene is 0.867g/cm<sup>3</sup>

Solution:

Use the formula for calculating mass through volume and density:

$$m = \rho \cdot V,$$

$$m(\text{toluene}) = 1.65 \text{ cm}^3 \times 0.867 \text{ g/cm}^3 = 1,431 \text{ g}.$$

$$M(\text{toluene}) = 92,14 \text{ g/moles},$$

$$n(\text{toluene}) = 1,431 \text{ g} / 92,14 \text{ (g/moles)} = 0,01553 \text{ moles}.$$

$$N_A = 6,022 \cdot 10^{23} \text{ moles}^{-1},$$

$$N(\text{atoms}) = 0,01553 \text{ moles} \times 6,022 \cdot 10^{23} \text{ moles}^{-1} = 0,09352 \times 10^{23} \text{ atoms}$$

Answer:  $0,09352 \cdot 10^{23}$  atoms.