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EXAMPLE 2-3. HOW MANY ATOMS CAN BE FOUND IN A SPECK OF COLLOIDAL SILVER? THE SPECK IS A CUBE 10^{-6} cm ON AN EDGE. SILVER: Atomic weight = 107 ; SPECIF GRAVITY = 10.5

VOLUME = $(10^{-6}\text{cm})^3 = 10^{-18}\text{cm}^3$

MASS = (DENSITY)(VOLUME) = $(10.5\ \text{g/cm}^3)(10^{-18}\text{cm}^3) = 10.5 \times 10^{-18}$ g

WE MAKE A PROPORTION KNOWING THAT ONE MOLE (107 g) HAS 6.02×10^{23} ATOMS:

$$\frac{6.02 \times 10^{23}\ \text{atoms}}{107\ \text{g}} = \frac{N\ \text{atoms}}{10.5 \times 10^{-18}\ \text{g}}$$

$$N = \left(\frac{10.5 \times 10^{-18}\ \text{g}}{107\ \text{g}}\right)(6.02 \times 10^{23}\ \text{atoms}) = 0.59 \times 10^{5}\ \text{atoms} = 5.9 \times 10^{4}\ \text{atoms}$$

THIS SMALL PIECE OF SILVER CONTAINS 59 000 ATOMS.

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IF THE CHARGE IS MOSTLY ON THE ELECTRON'S CLOUDS, ERS MUST HAVE SOMETHING TO DO WITH WEIGHT/GRAVITY.

Atomic area = PRESSURE / GRAVITY ?

GRAVITY PULLS: INTERACTION BETWEEN BODIES IN MASS OR VOLUME. (SPOOKY)

$\frac{63.54}{N_A} = 1,055049339 \times 10^{-22}$

Atomic weight ≠ At. Nº

Questions

2-1 $D = \frac{M}{V}$ $\quad \left[\frac{M}{L^3}\right] \neq \left[\frac{M}{L^3}\right]$

2-2 $^{63}_{29}Cu$ ELECTRONS = 29 (NEUTRAL)
ELECTRONS = 27 (DOUBLY CHARGED)
NEUTRONS = 34

$^{65}_{29}Cu$ NEUTRONS = 36
PROTONS = 29
NUCLEONS = 65

Atomic weight $^{65}_{29}Cu = \frac{65\ \text{g}}{6.0235 \times 10^{23}} = 1,079 \times 10^{-22}$ g.

Atomic number $^{65}_{29}Cu = 29$ $\quad ^{63}_{29}Cu = 29$

2-3 THEY HAVE 26 ELECTRONS NEGATIVELY CHARGED OPPOSING THE PROTONS' CHARGE, THIS WAY THEY ARE HELD APART BY THE ELECTRIC FORCES.

Atom weight = molar mass / correction

2-4 $^{1}_{1}H = 0.0899 \times 10^{-3}$ g/cm³ $\quad$ Atomic weight = $\frac{1}{N_A} = 1,66 \times 10^{-24}$ g; $\quad \frac{1,00794}{N_A} = 1,673673 \times 10^{-24}$

2-5 $^{8}O = 1.429 \times 10^{-3}$ g/cm³ $\quad$ Atomic weight = $\frac{16}{N_A} = 1,33 \times 10^{-23}$ g $\quad \frac{15,9994}{N_A} = 2,656 60440 \times 10^{-23}$

Atoms in 180 g of $H_2O = 1,084 \times 10^{25}$ atoms

$H_2O = 2(1,66 \times 10^{-24}) + (1,33 \times 10^{-23}) = 1,66 \times 10^{-23}$ g $\quad 1,084 \times 10^{25}$ molecules of H_2O in 180 g of H_2O

$2(^{1}H) + (^{8}O) = 10,324008 = 1,324008 \times 10^{-24}$ g; $\quad 180/g = 13,2581 \times 10^{25}$ molecules of H_2O in 180 g of H_2O

$144/1,33 \times 10^{-23}$ g $= 1,084 \times 10^{25}$ atoms of ^{8}O in 180 g of H_2O

$^{8}O = 1,084 \times 10^{25}$ molecules = 144 g; $\quad 180 - 144 = 36$ g of ^{1}H

$2(^{1}H) \times 1,084 \times 10^{25}$ molecules = 36 g; $\quad 180 - 36 = 144$ g of ^{8}O

$36/1,66 \times 10^{-24}$ g $= 1,084 \times 10^{25}$ atoms of ^{1}H in 180 g of H_2O

Atomic number & weight

CHECK ABOVE FOR CORRECTNESS.