between the like positive charges of neighboring nuclei.

29/06/2018

2-4 THE MASSES OF INDIVIDUAL ATOMS — AVOGADRO'S NUMBER

$\frac{\text{Weight of one } {}^{238}U \text{ atom}}{\text{Weight of one } {}^{56}Fe \text{ atom}} = \frac{238}{56}$ } Ratio of atomic weight

Also

$\frac{\text{Mass of one } {}^{238}U \text{ Atom}}{\text{Mass of one } {}^{56}Fe \text{ atom}} = \frac{238}{56}$ } Ratio of atomic mass

1 Mole of ${}^{56}Fe$ (iron) = 56 g
1 Mole of ${}^{238}U$ (uranium) = 238 g
} 1 mole is given when the mass in grams is equal the atomic weight.

IN EACH CHUNK THERE IS THE SAME AMOUNT OF ATOMS.

Ex.: Box A = 238 kg → GOLF BALLS = 23.8 g (EACH)
Box B = 56 kg → MARBLES = 5.6 g (EACH)
RATIO OF INDIVIDUAL MASSES: 23.8/5.6 → 238 : 56

∴ WE CONCLUDE THAT THERE ARE AS MANY GOLF BALLS IN A AS THERE ARE MARBLES IN B. THE GREATER MASS OF BOX A BEING EXACTLY ACCOUNTED FOR BY THE GREATER MASS OF INDIVIDUAL BALLS.

$\therefore \frac{238 \times 10^3}{238 \times 10^{-4}} = \frac{56 \times 10^3}{56 \times 10^{-4}}$

SIMILARLY, THERE MUST BE SOME DEFINITE NUMBER OF ATOMS IN A MOLE OF ANY ELEMENT. THIS NUMBER IS CALLED AVOGADRO'S NUMBER, $N_A$.
A MOLE OF MOLECULES CONTAINS $N_A$ MOLECULES, JUST AS A MOLE OF ATOMS CONTAINS $N_A$ ATOMS.

Ex.: ATOMIC WEIGHTS: CARBON = 12
OXYGEN = 16
$CO_2 = 12 + 16 + 16 = 44$
TOTAL = $3N_A$ ATOMS IN THE $N_A$ MOLECULES OF $CO_2$

1 MOLE OF $CO_2$ = 44 g, CONTAINING $N_A$ OF $C$, $2N_A$ OF $O$

THE AVOGADRO NUMBER HAS THE VALUE $N_A = 6.0225 \times 10^{23}$

IN THE EARLY DISCOVERED MEASUREMENT METHOD WAS TO FIND THE WEIGHT AND THE DENSITY OF THE VOLUME OF A DROP OF OIL, AND PUT IT TO SPREAD OUT ON THE SURFACE OF WATER UNTIL IT BECOMES A MONOLAYER ONE MOLECULE THICK. THIS GIVES THE DIAMETER OF A SINGLE MOLECULE, HENCE ITS VOLUME CAN BE ESTIMATED.

THE MASS $m_m$ OF A SINGLE IRON ATOM CAN BE FOUND BY A PROPORTION:

$\frac{56 \text{ g}}{6.02 \times 10^{23} \text{ atoms}} = \frac{m_m}{1 \text{ atom}}$ $\quad m_m = 9.3 \times 10^{-23}$ g

LECTURE

$\frac{12}{N_A} + \frac{16}{N_A} + \frac{16}{N_A} = \frac{44}{3N_A}$

LL MEANWHILE: 44 g OF $CO_2$ IN $3 \times N_A$ ATOMS.

→ CHECK FOR UNITS →

→ 6M x GRAMS DE SUBSTANCIA X EXISTEN $N_A$ ATOMOS VEZES =

30/10/13