Neutral: to charge of atom is 0 $\#p^+ = \#e^-$

Cl ↖ no charge $\#p^+ = 17$

$\#e^- = 17$

Cl^- ↖ negative $\#p^+ = 17$

$\#e^- = 18 = \#^- - (\text{charge}) = 17 - (-1)$

$= 18$

- Anion - negatively charged ion
- cation - positively " "

Mg^{2+} $\#p^+ = 12$

$\#e^- = 10$

8/25/15

Chemical reactions of two different isotopes are same

" " ions are different

Atomic mass unit

① amu - the unit used for mass of an atom (use of kilogram is useless)

② 1 amu = 1/12 of a C-12 atom

③ can be found on periodic table

Naturally occuring isotopes: C-12 Cl-35 Ne-20

C-13 Cl-37 Ne-21

Ne-22

Natural abundance - amount of 1 isotope relative to the other. Sum to 100%

99% C-12 90.48% Ne-20

1% C-13 .27% Ne-21

9.25% Ne-22

① Amu of an element = $\sum$ ((fraction of isotope) × (mass of isotope))

Isotope	Amu	Natural abundance
Ne-20	19.99amu	90.48% = .9048
Ne-21	20.99amu	.27% = .0027
Ne-22	21.99amu	9.25% = .0925

Atomic mass Ne = 0.9048(19.99) + .0027(20.99) + .0925(21.99)

= 20.177amu

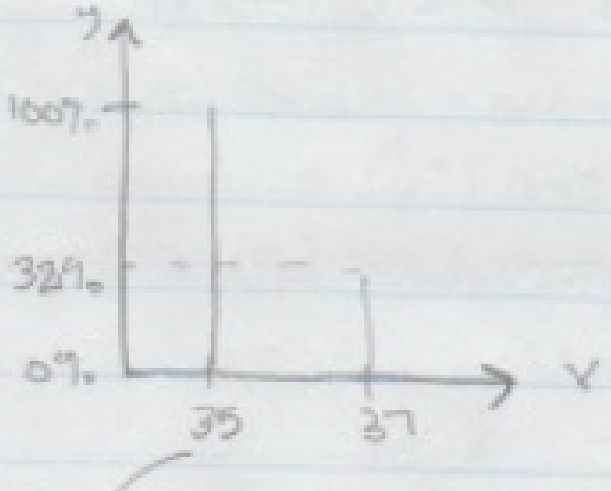
Isotope	Atomic mass	natural abund
Cl-35	34.97amu	75.77%
Cl-37	—	24.23%

$35.45amu = \underbrace{0.7577(34.97amu)}_{Cl\text{-}35} \underbrace{+0.2423(x)}_{Cl\text{-}37}$

$[x = 36.95amu]$

Mass Spectrum:

① mass spectroscopy (ms) - technique that separates particles based on their mass



→ more abundant of 2 isotopes - intensity is normalized to 100%

Natural abundance = $\frac{\text{intensity of isotope}}{\text{Total intensity}}$

$Cl\text{-}35 = \frac{100\%}{100\% + 32\%} = 75.76\%$

Chapter 2: Measurements

- qualitative data - subjective to observer
- quantitative data - can be measured
  ① Units for quantitative measurements
  Ex. 300 grams

7 SI units

- International system of units (SI) - m, g,
- English system - yds, oz, lbs

SI units

length - m - meter

mass - kg ↓ kilogram

Includes gravitational pull

weight -

time - s - seconds

temp. - K - Kelvin (Caraunt of Kinetic energy)

Other units

Unit (in) (ft) (yd)
miles, inches, feet, yard

ounces (oz), pounds (lbs)
↓

°C, °F

[KE - associated w/ motion]

Temperature Conversions

① $K = C^\circ + 273.15$

- Kelvin is absolute scale - no negative values
- $0^\circ = 273.15$ °C↑ K↑
- $1^\circ = 274.15$

② $^\circ C = \frac{(^\circ F - 32)}{15}$

③ Convert 298 K to °F

Freezing point of H_2O
- 32°F
- 0°F
- 273.15 K

room temp
25°C

boiling point H_2O
100°C