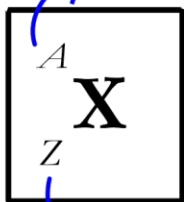


Nuclear Symbol

mass number
(protons + neutrons)



atomic number
(protons)

Isotopes	
35	37
Cl	Cl
17	17

Isotopes:

Same proton number element different neutron number.

Similar chemical properties (same no of electrons) but different physical properties (due to different masses)

Isoelectronic:

Species with same number of electrons

Isotonic:

Species with same number of neutrons.

Percentage Abundance

Silicon has three stable isotopes, ^{28}Si , ^{29}Si and ^{30}Si . The heaviest isotope, ^{30}Si , has a percentage abundance of 3.1 %.

Calculate the percentage abundance of the lightest isotope to one decimal place.

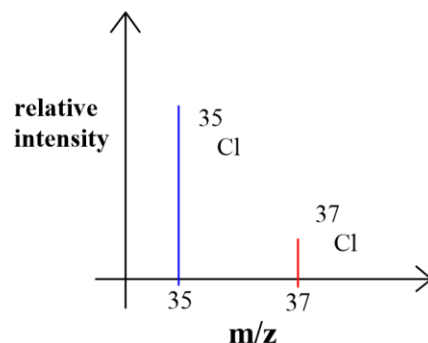
$$28.09 = [3.10 \times 30 + 28x + 29(96.9 - x)]/1000$$

$$2809 = 3.10 \times 30 + 28x + 29(96.9 - x);$$

$$\% \text{ } ^{28}\text{Si} = (93 + 2810.1 - 2809) = 94.1 \%$$

Mass spectra of Isotopes

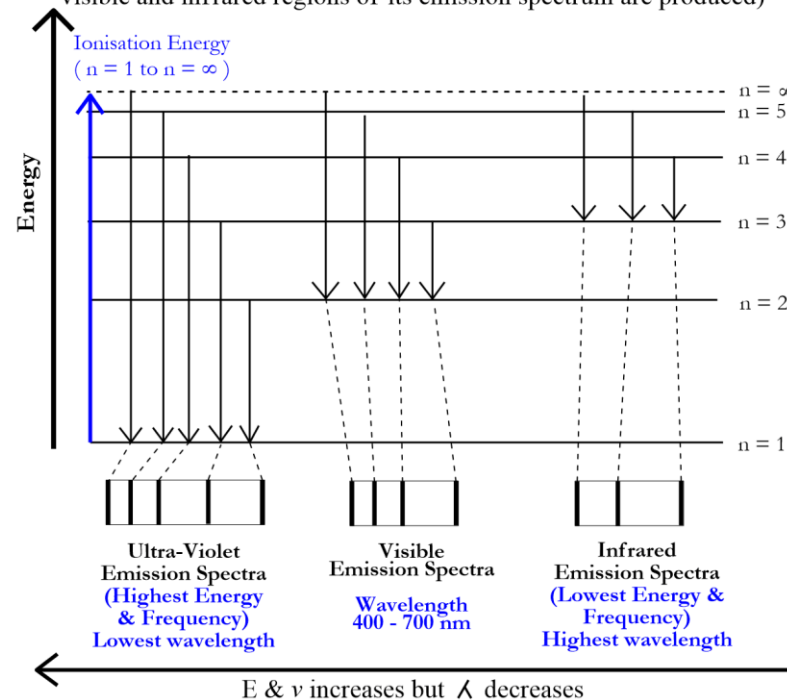
HL content



Emission Energy Level & Spectrum

Draw and label an energy level diagram for the hydrogen atom.

(In your diagram show how the series of lines in the ultraviolet, visible and infrared regions of its emission spectrum are produced)



E & v increases but λ decreases

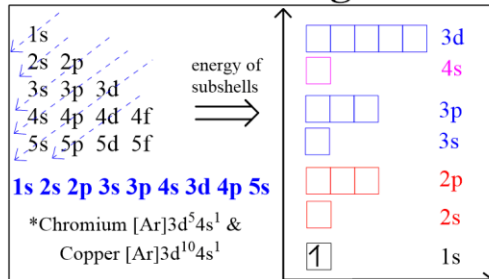
Orbitals

shell (n)	subshell	orbital (n^2)	$e^-(2n^2)$
n=1	1s	1 ○ s	2
n=2	2s, 2p	4 ○ 2s, 2Px, 2Py, 2Pz	8
n=3	3s, 3p & 3d	9 3s, 3Px, 3Py, 3Pz, 3dxy, 3dxz, 3dyz, 3dx ² -y ² , 3dz ²	18

Aufbau: electrons fill atomic orbitals of the lowest available energy levels before occupying higher levels

Pauli exclusion principle: Each orbital must have at the maximum two electron with spin pairing.

Electronic Configuration



What is the FULL electron configuration of vanadium? : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3 4s^1$ & CONDENSED [Ar] $3d^3 4s^1$

What is the FULL electron configuration of vanadium²⁺? : $1s^2 2s^2 2p^6 3s^2 3p^6 3d^3$ & CONDENSED [Ar] $3d^3$

Hund's rule: every orbital in a subshell is singly occupied with one electron before any one orbital is doubly occupied.

Describe the emission spectrum of hydrogen. Outline how this spectrum is related to the energy levels in the hydrogen atom.

- series of lines **evidence of energy levels**
- electron transfer/transition between higher energy level to lower energy level /
- electron transitions into first energy level causes UV series /transition into second energy level causes visible series / transition into third energy level causes infrared series;
- convergence at higher frequency or energy but at lower wavelength.

Continuous spectrum : contains all wavelength of light
Line spectrum : contains specific wavelength of light