ATOMIC STRUCTURE

Cathode Rays → Travel from cathode (−) to anode (+) negatively charged

Characteristics

- Travel in st. line
- −vely charged (e^-).
- Show deflection when electrical & Mag field is applied
- Create fluorescence on the fluorescent or phosphorescent material
- such as ZnS (Zinc Sulphide).
- Penetrate through thin sheets such as aluminium.
- q/m ratio [specific charge] → same for all cathode Rays.

e^- charge ⇒ -1.6×10^{-19} C
mass of e^- ⇒ 9.1×10^{-31} Kg
$\frac{e}{m} = 1.76 \times 10^{11}$ C/Kg

Anode rays → (+ve) charged q/m ratio different for different gases.

p charge ⇒ 1.6×10^{-19}
mass of p = 1.67×10^{-27} Kg
e/m ratio = 9.6×10^{7} C/Kg

Neutron → Atomic Number (Z) = no. of protons
Mass number (A) = no of protons + no. of neutrons

$_{Z}^{A}X$ X → element, A → Mass no.

Properties of charge

$q = ne$

$F_{electro} = \frac{Kq_1q_2}{r^2}$ $\quad K = \frac{1}{4\pi\epsilon_0} = 9 \times 10^9\ Nm^2/C^2$ $= 1$ (in CGS)

$PE = \frac{Kq_1q_2}{r}$ $\quad$ KE of charge = Work Done = qV

1 N = 10^5 dyne
1 C = 3×10^9 esu
1 pm = 10^{-12} m
1 nm = 10^{-9} m
1 μm = 10^{-6} m
1 mm = 10^{-3} m
1 Å = 10^{-10} m

Spin Quantum No.

e^- rotates about its own axis

→ $+\frac{1}{2}$

→ $-\frac{1}{2}$

Pauli's Exclusion Principle

↳ No two e^-'s (in same atom) can have same set of 4 quantum no's.

↳ Only two e^-'s with opp. spin can be present in an orbital.

→ 1 orbital has $2e^-$ with opp spin.

↳ No of e^- in n^{th} shell → $2n^2$

No of e^- in a subshell ⇒ $2(2l+1)$

Afbau's Principle [(n+l) Rule]

* Energy of orbitals/subshells
* e^- first [illegible] lower energy orbits
* e^- filling → Inc order of energy of orbitals/subshells

Energy $\propto (n+l)$

If $n+l$ → same, check (n)

	1s	2s	2p	3s	3p	3d	4s	4p	4d	5s
n+l	1+0 = 1	2	3	3	4	5	4	5	6	5

$1s < 2s < 2p < 3s < 3p < 4s < 3d < 4p < 5s < 4d < 5p < 6s < 4f < 5d < 6p < 7s < 5f < 6d < 7p < 8s$ ---