

=> electronic structure =<

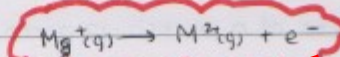
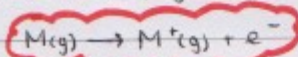
- Electrons occupy fixed energy levels. Each atom has it's own unique set of energy levels.
- Electrons exist in orbitals in energy levels. $\rightarrow s, p, d, f$.
- Electrons repel each other so spin in opposite direction in sub shells.
- 4s fills before 3d. (except for Cu and Cr) $\rightarrow 4s^1 3d^5, 4s^1 3d^6$.

=> Periodic table =<

- Order of increasing atomic number. (row = period, column = group).
- Each group has similar properties.

=> ionisation energy =<

- **First ionisation energy** - energy required to remove one electron ^{per atom} from one mole of gaseous atoms to produce 1 mole of gaseous 1+ ions.



- Decreases down group 2. $\rightarrow$ shielding, atomic radius.
- Generally increases across a period $\rightarrow$ nuclear charge.
 - $\rightarrow$ GROUP 2 & 3: 4p orbital has higher energy than 3s so further from nucleus $\therefore$ lower.
 - $\rightarrow$ GROUP 5 & 6: electron being removed from a singly occupied sub-shell so lower. (electron repulsion).
- successive ionisation energies increase. $\rightarrow$ fewer electrons remain so less repulsion.
- $\rightarrow$ Big jumps when a shell removed. $\rightarrow$ less shielding.

=> atomic & ionic radius =<

- Atomic radius decreases across a period. $\rightarrow$ nuclear charge.
- Atomic radius increases down a group. $\rightarrow$ more shells.
- Ionic radius for cations are smaller than atom of the element.
- Anionic radius is always larger than the atom of the element.

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Page 2 of 2