

TRENDS

- ① ELECTRONIC CONFIGURATION
- ② ATOMIC RADIUS
- ③ IONISATION ENERGY
- ④ ELECTRON AFFINITY
- ⑤ ELECTRONEGATIVITY
- ⑥ MELTING POINT

Most trends can be explained by considering the attraction between the protons in the nucleus and the electrons in the outer shell or energy level

DOWN GROUPS

- atomic number increases
- atoms have more protons - increased nuclear charge
- atoms get bigger - electrons occupy more shells
- outer electrons are shielded by filled inner shells
- outer electrons are further from nucleus
- the pulling power of the nucleus gets less
- outer electrons are held less strongly

ACROSS PERIODS

- atomic number increases by one each time
- atoms have one more proton and electron
- slight increase in nuclear charge
- electrons occupy the same shell - no increase in shielding
- outer electrons are no further from nucleus
- the pulling power of the nucleus gets a little greater
- outer electrons are held more strongly

Nuclear Charge

The charge due to the protons in the nucleus

Effective nuclear Charge

The effectiveness of the nuclear charge after passing through any filled inner shells

PERIODIC TRENDS

ALL TRENDS REFER TO GOING DOWN A GROUP AND ACROSS A PERIOD

ATOMIC RADIUS

- Groups INCREASES • more electrons going into shells further from nucleus
- Periods DECREASES • increased nuclear charge attracts electrons

IONISATION ENERGY

- Groups DECREASES • electrons further from nucleus
- more shielding
- electrons held less strongly - easier to remove
- Periods INCREASES • increased nuclear charge attracts electrons
- electrons become harder to remove
- IRREGULARITIES due to the way orbitals are filled

ELECTRONEGATIVITY

- Groups DECREASES • electrons further from nucleus
- more shielding
- electron pair in covalent bond is attracted less strongly
- Periods INCREASES • increased nuclear charge attracts electron pair in bond

ELECTRON AFFINITY

- Groups LESS NEGATIVE • electrons further from nucleus + more shielding
- electron are attracted less strongly
- Periods MORE NEGATIVE • increased nuclear charge attracts electrons
- electron is easier to pull in

MELTING POINT - dependant on structure and bond type

- Groups DECREASES • metallic bonding decreases as size increases
- electron cloud isn't as effective at holding ions together
- Periods VARIABLE • depends on structure and bonding - rises then falls
- rises as metals contribute more electrons to the cloud
- big rise for giant molecules in Group IV
- drops for simple molecules with weak intermolecular forces