Cheatography

The periodic table Cheat Sheet

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The modern periodic table

Alkaline (ns^1)	lose 1 e^-
	valence 1+⟶Noble gas configuration
Alkaline earth (ns)	lose 2 e^-
	valence 2+⟶Noble gas configuration
Group 13(ns np)	light elements lose 3 e^-
	heavy elements lose 3 e^-
Group 15/ Nitrogen group (ns np)	gain 3 e^-
	valence 3- (more important for light elements)
Group 16/ Oxygen group (ns np)	gain 2 e^-
	valence 2-⟶Noble gas configuration
Group 17/ Halogens (ns np)	gain 1 e^-
	valence 1-⟶Noble gas configuration

Atomic radii and ionic radii

In a group it increases with Z	In a period it decreases with Z

Ionization energy

realated with the metallic character: higher IE, easier to eject an e^-, higher metallic character	IE depends on electron--nucleus attraction
In a group it increases from bottom to top (from bigger to smaller radius))	In a period it increases from left to right (when Zeff increases)

Quantity of energy a gaseous atom must absorb to be able to expel an electron

Magnetic properties

Diamagnetic atom	all e^- are paired and the individual magnetic effects cancel out
Paramagnetic atom	has unpaired e^-, the individual magnetic effects don't cancel out. These unpaired e^- posses a magnetic moment that causes the atom to be attracted to an external magnetic field

Sizes of atoms and ions

Atomis radius is hard to define, effective charge density is extended to infinity, but the *effective atomic radius is where there is a 95% of the electron charge density*	Atomis radius depends on the size of the electron cloud: from different shells it depends on the value of n, for a given shell it depends on the Zeff
Penetration:how close an electron gets to the nucelus	s e^->p e^->d e^- (in order of penetration ability)
Screening: how an outer e^- is blocked from the nuclear charge by inner e^-	Zeff=Z-σ

Slatter rules

considered e^- in an *ns* or *np* orbital

- all e^- in ns and np orbitals with the same value of n contribute with σ=0,35 (for n=1, σ=0,30)
- all e^- in orbitals with $n_i=n_{s,p}-1$ contribute with σ=0,85
- all e^- in orbitals with $n_i=n_{s,p}-2$ or lower contribute with σ=1

considered e^- in an *nd* or *nf* orbital

- all e^- in same nd and nf orbitals contribute with σ=0,35
- all the rest of e^- ($n_i \leq n_{d,f}$) contribute with σ=0,35

Amount of nuclear charge felt by an e^- depends on its orbital and on the number of e^- inbetween itself and the nucleus

Electron Affinity

Related with the non-metallic character	the larger EA abs. value, the easier it is to gain an electron, the less metallic the element id
In a period, increases from left to right (as Zeff)	In a group, increases from bottom to top
*large number of anomalies	B.,N,O,F

Energy change that occurs when an atom in the gas phase gains an electron

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