

CAIE IGCSE Chemistry

8.1 Arrangement of elements

Notes

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Describe the Periodic Table as an arrangement of elements in periods and groups and in order of increasing proton number/ atomic number

- The Periodic Table can be used to classify elements and predict properties of elements by the way that they are arranged in the table...
- Elements are arranged:
 - in order of increasing atomic number,
 - in rows called periods
 - in vertical columns called groups

H																				He
Li	Be										B	C	N	O	F					Ne
Na	Mg										Al	Si	P	S	Cl					Ar
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br				Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I				Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At				Rn
Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts				Og
			Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu				
			Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr				

Describe the change from metallic to non-metallic character across a period

- Metals make up most of the periodic table and are found towards the left of the table.
- Non-metals are found towards the top right of the periodic table.
- The metallic character of an element is its tendency to lose an electron and form positive ions
 - Increases as you move down a group
 - Decreases across the period
- The non-metallic character of an element is its tendency to gain an electron.
 - Decreases as you move down a group
 - Increases across the period



Describe the relationship between group number and the charge of the ions formed from elements in that group

- Elements in the same group have the same amount of electrons in their outer shell
 - Group 1 has 1 electron in its outer shell, group 7 has 7 etc...
- Group 1, 2 and 3 elements (metals) will lose electrons to obtain full outer shell electron configuration
 - E.g. Group 1 elements need to lose 1 electron so form +1 ions
- Group 5, 6 and 7 elements (metals) will gain electrons to obtain full outer shell electron configuration
 - Group 6 elements need to gain 2 electrons so form -2 ions

Explain similarities in the chemical properties of elements in the same group of the Periodic Table in terms of their electronic configuration

- Chemical properties are determined by the number of electrons in the outer shell of an atom.
- Elements in the same group have the same number of electrons in their outer shell, which gives them similar chemical properties
 - Group 1 has 1 electron in its outer shell, group 2 has 2 etc...

Explain how the position of an element in the Periodic Table can be used to predict its properties

- The chemical properties of an element can be predicted by its position in the periodic table as elements in the same group will have similar chemical properties, because they have the same number of outer shell electrons
- The metallic and non metallic character of an element can also be determined by its position in the periodic table



(Extended only) Identify trends in groups, given information about the elements

- Trends in melting points, density and reactivity in a group in the periodic table can be identified and explained using given information such as the tendency for that element to lost/gain an electron
 - E.g. The reactivity of group 1 elements increases going down the group as the atomic radius and electron shielding increases down the group, so there is less electrostatic attraction between the nucleus and outer shell electrons. Therefore less energy is required to remove an outer shell electron.
- Once you are given information regarding more than one element in a group, look at each of their positions in the group (i.e. near the top or bottom) and identify the trend shown by the elements with given information
 - Going down a group means going up in number of electron shells

