Cheatography

Periodic Table <3 Cheat Sheet

by anonymous_714 via cheatography.com/197151/cs/41614/

COMPARISON

GROUP I	TRANSITION METALS
Physical properties	Physical properties
Soft.	*Hard.*
Low melting point. (decrease down the group).	*High melting point.*
Low density. (increase down the group).	*High density.*
All their compounds are soluble in water.	*Not all their compounds are soluble in water.*
Chemical properties	Chemical properties
Monovalent.	*Elements has more than one oxidation state.*
Lose one e^- & form a +ve ion.	*Loses 1 electron or more & form colored, +ve ions.*
Very reactive (increase down the group).	*Some are reactive (less reactive than groups 1, 2 and 3).*
No catalytic properties.	*Their elements & compounds have catalytic properties (except zinc).*
Their compunds are white when solid & colorless when aqueous.	*Most of their compounds are colored in both solid & liquid states.*
React with cold water forming an alkali (metal hydroxide + hydrogen).	*Few can react with steam forming metal oxide (reaction takes a lot of time.*
React with Oxygen forming metal oxide (METAL$_2$OXYGEN).	*React with Oxygen forming metal oxide.*
Their compounds never undergo thermal decomposition except group 1 nitrate ($2NaNO_3$ --> $2NaNO_2$ + O_2).	*Their compounds undergo thermal decomposition to give the metal oxide.*

GROUP II

GROUP VII

AKA Halogens.

PHYSICAL PROPERTIES

$ Non-metals.
$ Low melting and boiling points (increase down the group).
$ Low density (increase down the group).
$ Not shiny.
$ Not malleable nor ductile.
$ Poor conductor of electricity.
$ All of their compounds are soluble in water except the ones with Silver & Lead.
$ Color gets darker down the group.

CHEMICAL PROPERTIES

$ Monovalent.
$ Gain one e^- & form a -ve ion / share.
$ Very reactive (decrease down the group).
$ Exist as diatomic molecules.
$ They react with metals forming salts.
$ Their compounds with Hydrogen are usually strong acids.
$ Each halogen can replace/oxidize the halogen below it in its compound.

HALOGENS (part 2)

GROUP VIII

AKA Noble gases.

They are all gases.

They are all inert.

Valency = 0 *(outermost energy level is filled with e^-s) (no sharing, losing or gaining e^-s).*

Mono-atomic.

$ Helium is used in filling balloons.
$ Argon is used in filling light bulbs.
$ Krypton & Xenon used in commercial lights.

AKA Alkaline Earth metals.

PHYSICAL PROPERTIES

$ Solid.
$ Shiny.
$ Silver.
$ Malleable & ductile (layers of +ve ions can slide over each other).
$ Good conductor of electricity (free moving e^-s).
$ Not all their compounds are soluble in water.
$ All their compounds are white when solid & colorless when aqueous.

CHEMICAL PROPERTIES

$ Divalent (one oxidation state).
$ Lose 2 electrons & form a +ve ion (+2).
$ Reactive bas less reactive than group 1 (increases down the group).
$ No catalytic properties.
$ React with oxygen forming metal oxide.
$ Their compounds undergo thermal decomposition to give the metal oxide.
$ React with water forming metal hydroxide or metal oxide.

Cold water (metal hydroxide and hydrogen)

$Ba + 2H_2O \rightarrow Ba(OH)_2 + H_2$.

$Sr + 2H_2O \rightarrow Sr(OH)_2 + H_2$.

Hot water (metal oxide and hydrogen)

$Mg + H_2O \rightarrow MgO + H_2$.

$Ca + H_2O \rightarrow CaO + H_2$.

"As we go down the group, the reaction with water is faster."

PROPERTIES COMMON IN ALL METALS

$ Solid.
$ Shiny (metallic luster).
$ Silver.
$ Malleable & ductile --> layers of +ve ions can slide over each other.
$ Good conductor of electricity (free moving e^-s).

1- Fluorine is a yellow gas. When aqueous, it turns colorless.

2- Chlorine is greenish yellow gas. When aqueous, it turns colorless.

3- Bromine is a red brown liquid. When in gaseous state, it stays red brown. When aqueous, it turns orange.

4- Iodine is a dark grey solid. When in gaseous state, it turns purple. When aqueous, it turns red brown.

5- Astatine is a black solid.

$Cl_{2\,(g)} + 2KBr_{(aq)} \rightarrow KCl_{(aq)} + Br_{2\,(aq)}$.

Greenish yellow + colorless --> colorless + orange.

$Cl_{2\,(g)} + 2KI_{(aq)} \rightarrow KCl_{(aq)} + I_{2\,(aq)}$.

Greenish yellow + colorless --> colorless + red brown.

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