Solubility and Qualitative Tests Cheat Sheet

by peaceknight05 via cheatography.com/126547/cs/26879/

Reactivity Series

Potassium
Sodium
Calcium
Magnesium
Aluminium
Carbon
Zinc
Iron
Lead
Hydrogen
Copper
Silver
Gold

Addition of Sodium Hydroxide

Cation	A few drops	In excess
Al^{3+}	White ppt	Ppt dissolves to give colourless soln
Ca^{2+}	White ppt	Ppt is insoluble
Cu^{2+}	Light blue ppt	Ppt is insoluble
Fe^{2+}	Green ppt	Ppt is insoluble
Fe^{3+}	Reddish-brown ppt	Ppt is insoluble
Pb^{2+}	White ppt	Ppt dissolves to give colourless soln
Zn^{2+}	White ppt	Ppt dissolves to give colourless soln
$NH4^{+}$	No ppt	Ammonia gas evolved upon heating

Addition of Aqueous Ammonia

Cation	A few drops	In excess
*Al^{3+}	White ppt	Ppt is insoluble
Ca^{2+}	No ppt	-

Addition of Aqueous Ammonia (cont)

Cu^{2+}	Light blue ppt	Ppt dissolves to give dark blue soln
Fe^{2+}	Green ppt	Ppt is insoluble
Fe^{3+}	Reddish-brown ppt	Ppt is insoluble
*Pb^{2+}	White ppt	Ppt is insoluble
Zn^{2+}	White ppt	Ppt dissolves to give colourless soln

*Al^{3+} and Pb^{2+} can be identified by using aqueous potassium iodide (KI) which forms yellow ppt in the presence of lead.

Amphoteric Metal Oxides

Zinc (Zn)
Aluminum (Al)
Lead (Pb)

Mnemonic is ZAP

Acidic Oxides

Sulfur Trioxide	SO3	Sulfuric Acid	H2SO4
*Sulfur Dioxide	SO2	Sulphurous Acid	H2SO3
Nitrogen Dioxide	NO2	Nitric Acid	HNO3
*Dinitrogen Pentoxide	N2O5	Nitric Acid	HNO3
Carbon Dioxide	CO2	Carbonic Acid	HCO3
*Phosphorus (V) Oxide	P4O10	Phosphoric Acid	H3PO4
*Phosphorus (III) Oxide	P4O6	Phosph-orous Acid	H3PO3
*Manganese Heptoxide	Mn2O7	Perman-ganic Acid	HMnO4
*Dichlorine Monoxide	Cl2O	Hypoch-lorous Acid	HOCl
*Dichlorine Heptoxide	Cl2O5	Perchloric Acid	HClO4

*Advanced (NIS)

Basic Oxides

All Group I and II metals (except Beryllium)	Li2O, Na2O, MgO, CaO, etc.
*Thallium (I) Oxide	Tl2O
*Bismuth (III) Oxide	Bi2O3

*Advanced (NIS)

Always Soluble

Sodium	Na^{+}
Potassium	K^{+}
Ammonia	$NH4^{+}$
Nitrate	$NO3^{-}$

Mnemonic: SPAN

Soluble Salts

All halides	Except Pb and Ag compounds (e.g. PbCl2)
All sulphates	Except Ba, Ca (sparingly soluble) and Pb (e.g. BaSO4)

Insoluble Salts

All Carbonates	Except SPA (Sodium, Potassium, Ammonium)
All Phosphates	Group I Metals and Ammonium compounds
All Hydroxides	Except SPCM (Sodium, Potassium, Calcium - sparingly soluble, Magnesium - very sparingly soluble)

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