Nishant Jindal

Oxyacid

acid in which oxygen and hydrogen is present

H_2SO_4 H_3PO_4

CH_3COOH	= 1
HNO_3	= 1

HF HCl HBr HI

these are hydra acid

basicity ⇒ number of Ionisable hydrogen

basicity ∝ no of hydrogen except

	basicity
H_3PO_3	2
H_3PO_2	1
H_3BO_3	1
$H_4P_2O_5$	2

$P = 3s^2 3p^3$

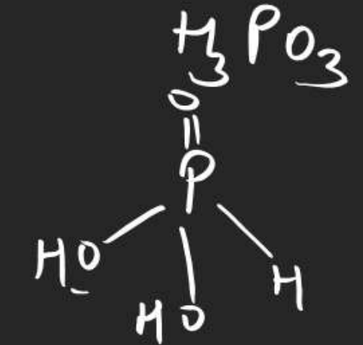
Structure of oxyacid

$S = 3s^2 3p^4$ ① select the Central atom

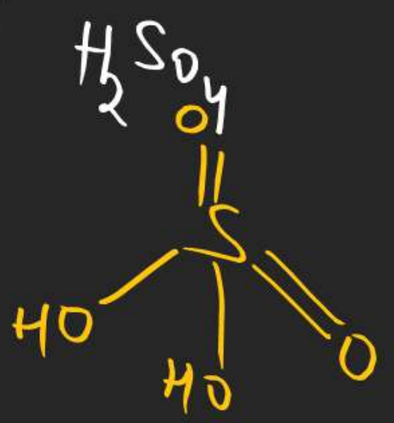
=

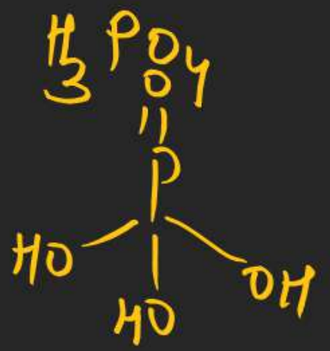
least E.N atom act as Central atom (C.A) except Hydrogen

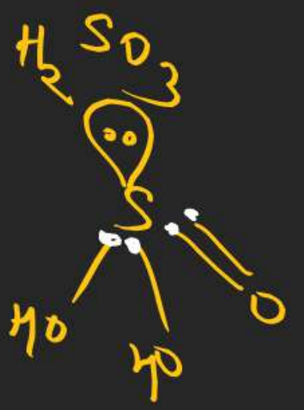
② basicity of oxyacid expressed by no of OH group which is directly attached with Central atom.



basicity = 2







Naming of oxy acid

highest oxidation state = ic acid

not highest o.s = ous acid

H_3PO_4

$3+x+4(-2)=0$

$x=5$

Phosphoric acid

H_3PO_3

$3+x+3(-2)=0$

$x=+3$

Phosphorous acid

O.S Range = $(n-8)$ to n

n = no of val. e^-

P	=	-3 to $+5$
S	=	-2 to $+6$
Cl	=	-1 to $+7$

H_2SO_4 Sulphuric acid

H_2SO_3 Sulphurous acid

$2+x+3(-2)=0$

$x=+4$

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naming of anion of oxyacid

dihydrogen phosphate

$H_3PO_4 \rightleftharpoons H^+ + H_2PO_4^-$ (1° phosphate ion)

hydrogen phosphate

$H_2PO_4^- \rightleftharpoons H^+ + HPO_4^{-2}$ (2° phosphate)

$HPO_4^{-2} \rightleftharpoons H^+ + PO_4^{-3}$ (3° phosphate)

Phosphate

ic acid → ion ate

ous acid → ite

naming of ion only

ionisable hydrogen use

$H_2SO_4 \rightleftharpoons H^+ + HSO_4^-$ (Hydrogen Sulphate)

$HSO_4^- \rightleftharpoons H^+ + SO_4^{-2}$ (Sulphate)

$H_3PO_3 \rightleftharpoons H^+ + H_2PO_3^-$ (Hydrogen phosphite)

$H_2PO_3^- \rightleftharpoons H^+ + HPO_3^{-2}$ (phosphite)

Basicity $= H_3PO_3 = 2$

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Prefix For oxyacid

Meta ⟶ When one water molecule is removed from one molecule of acid.

$$n H_3PO_4 \xrightarrow{-n H_2O} (HPO_3)_n$$

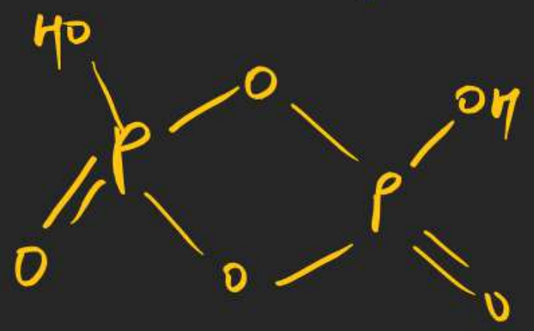
Phosphoric acid — Metaphosphoric acid

$n = 1, 2 \rightarrow$ not exist

$n = 3$ $\quad 4$ $\quad 5$ $\quad 6$

$H_3P_3O_9$ $\quad H_4P_4O_{12}$ $\quad H_5P_5O_{15}$ $\quad H_6P_6O_{18}$

$n = 2$ Prop. structure



$H_3PO_3 \xrightarrow{-H_2O} HPO_2$

Phosphorous acid — metaphosphorous acid

$n\,H_3BO_3 \xrightarrow{-nH_2O} (HBO_2)_n$

Boric acid — Metaboric acid

only $n = 3$

$H_3B_3O_6$ (cyclic metaboric acid)

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$H_2SO_4 \xrightarrow{-H_2O} SO_3$

$H_2SO_3 \xrightarrow{-H_2O} SO_2$

$H_2CO_3 \xrightarrow{-H_2O} CO_2$

these are not Meta

these are anhydride

Ortho → ortho prefix provided for those oxyacid which can form their meta form

Phosphoric acid
Orthophosphoric $H_3PO_4 \xrightarrow{-H_2O} HPO_3$

Orthophosphorous $H_3PO_3 \xrightarrow{-H_2O} HPO_2$

Ortho boric acid $H_3BO_3 \xrightarrow{-H_2O} HBO_2$

H_2SO_4
H_2SO_3
H_2CO_3
} Ortho not use

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Pyro ⇒ when one water molecule removed from two molecule of acid.

$2H_3PO_4 \xrightarrow{-H_2O} H_4P_2O_7$ (Pyrophosphoric acid)

$2H_3PO_3 \xrightarrow{-H_2O} H_4P_2O_5$ (Pyrophosphorous acid)

$2H_2SO_4 \xrightarrow{-H_2O} H_2S_2O_7$ (oleum) (Pyrosulphuric acid)

$2H_2SO_3 \xrightarrow{-H_2O} H_2S_2O_5$ (Pyrosulphurous acid)

$2HNO_3 \xrightarrow{-H_2O} N_2O_5$

$2HNO_2 \xrightarrow{-H_2O} N_2O_3$

$2HClO_4 \xrightarrow{-H_2O} Cl_2O_7$

these are anhydride

Hypo ⇒ one oxygen atom removed from ous oxyacid

Phosphorous H_3PO_3 $\xrightarrow{-O}$ H_3PO_2 hypophosphorous acid

Nitrous HNO_2 $\xrightarrow{-O}$ HNO = hyponitrous acid (monomer form does not exist ($(HNO)_2$)

Sulphurous H_2SO_3 $\xrightarrow{-O}$ H_2SO_2 hypo sulphurous acid (sulphoxalic acid)

Chlorous $HClO_2$ $\xrightarrow{-O}$ $HClO$ hypochlorous acid

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Peroxy / Peroxo / Per ⇒ when one oxygen added in ic acid

if Oxidation state of out of Rang then we can use Peroxo / Peroxy

$H_3PO_4 \xrightarrow{+O} H_3PO_5$ (Per phosphoric acid / Peroxophosphonic acid)

$H_2SO_4 \xrightarrow{+O} H_2SO_5$ (Per sulphuric acid / Peroxo sulphuric acid)

HNO_3 ($+5$) $\xrightarrow{+O} HNO_4$ (Per nitric acid / Peroxo nitric acid)

$HClO_3$ (Chloric acid) $\xrightarrow{+O} HClO_4$ (Per Chloric acid)

Cl = -1 to $+7$

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