Acids and Bases

Oxyacids

Acid	Name
$HNO_{3(aq)}$	nitric acid
$HNO_{2(aq)}$	nitrous acid
$H_2SO_{4(aq)}$	sulfuric acid
$H_2SO_{3(aq)}$	sulfurous acid
$H_3PO_{4(aq)}$	phosphoric acid
$HC_2H_3O_{2(aq)}$	acetic acid
$HClO_{4(aq)}$	perchloric acid
$HBrO_{4(aq)}$	perbromic acid
$HIO_{4(aq)}$	periodic acid
$HClO_{3(aq)}$	chloric acid
$HBrO_{3(aq)}$	bromic acid
$HIO_{3(aq)}$	iodic acid
$HClO_{2(aq)}$	chlorous acid
$HClO_{(aq)}$	hypochlorous acid
$HBrO_{(aq)}$	hypobromous acid
$HIO_{(aq)}$	hypoiodous acid
$HFO_{(aq)}$	hypofluorous acid

Concentrated Reagents*

Reagent	Formula	Molar mass (g/mol)	Concentration (mol/L)	Concentration (mass %)
acetic acid	$HC_2H_3O_{2(aq)}$	60.05	17.45	99.8
carbonic acid	$H_2CO_{3(aq)}$	62.03	0.039	0.17
formic acid	$HCOOH_{(aq)}$	46.03	23.6	90.5
hydrobromic acid	$HBr_{(aq)}$	80.91	8.84	48.0
hydrochloric acid	$HCl_{(aq)}$	36.46	12.1	37.2
hydrofluoric acid	$HFl_{(aq)}$	20.01	28.9	49.0
nitric acid	$HNO_{3(aq)}$	63.02	15.9	70.4
perchloric acid	$HClO_{4(aq)}$	100.46	11.7	70.5
phosphoric acid	$H_3PO_{4(aq)}$	98.00	14.8	85.5
sulfurous acid	$H_2SO_{3(aq)}$	82.08	0.73	6.0
sulfuric acid	$H_2SO_{4(aq)}$	98.08	18.0	96.0
ammonia	$NH_{3(aq)}$	17.04	14.8	28.0
potassium hydroxide	$KOH_{(aq)}$	56.11	11.7	45.0
sodium hydroxide	$NaOH_{(aq)}$	40.00	19.4	50.5

*Typical concentrations of commercial concentrated reagents

Acid–Base Indicators

Common Name	Colour of $HIn_{(aq)}$	pH range	Colour of $In^-_{(aq)}$	Common name	Colour of $HIn_{(aq)}$	pH range	Colour of $In^-_{(aq)}$
methyl violet	yellow	0.0 – 1.6	blue	*p*-nitrophenol	colourless	5.3 – 7.6	yellow
cresol red (acid range)	red	0.2 – 1.8	yellow	litmus	red	6.0 – 8.0	blue
cresol purple (acid range)	red	1.2 – 2.8	yellow	bromothymol blue	yellow	6.2 – 7.6	blue
thymol blue (acid range)	red	1.2 – 2.8	yellow	neutral red	red	6.8 – 8.0	yellow
tropeolin oo	red	1.3 – 3.2	yellow	phenol red	yellow	6.4 – 8.0	red
orange iv	red	1.4 – 2.8	yellow	*m*-nitrophenol	colourless	6.4 – 8.8	yellow
benzopurpurine-48	violet	2.2 – 4.2	red	cresol red	yellow	7.2 – 8.8	red
2,6-dinotrophenol	colourless	2.4 – 4.0	yellow	*m*-cresol purple	yellow	7.6 – 9.2	purple
2,4-dinotrophenol	colourless	2.5 – 4.3	yellow	thymol blue	yellow	8.0 – 9.6	blue
methyl yellow	red	2.9 – 4.0	yellow	phenolphthalein	colourless	8.0 – 10.0	red
congo red	blue	3.0 – 5.0	red	α-naphtholbenzein	yellow	9.0 – 11.0	blue
methyl orange	red	3.1 – 4.4	orange	thymolphthalein	colourless	9.4 – 10.6	blue
bromophenol blue	yellow	3.0 – 4.6	blue-violet	alizarin yellow r	yellow	10.0 – 12.0	violet
bromocresol green	yellow	4.0 – 5.6	blue	tropeolin o	yellow	11.0 – 13.0	orange-brown
methyl red	red	4.4 – 6.2	yellow	nitramine	colourless	10.8 – 13.0	orange-brown
chlorophenol red	yellow	5.4 – 6.8	red	indigo carmine	blue	11.4 – 13.0	yellow
bromocresol purple	yellow	5.2 – 6.8	purple	1,3,5-trinitrobenzene	colourless	12.0 – 14.0	orange
bromophenol red	yellow	5.2 – 6.8	red				