Chemistry   Polyatomic Ions – Patterns (need to know)   Ms. Chubbuck

Check out the _patterns_ for the ions with the –ate suffix.

BO_3^{3-} borate	CO_3^{2-} carbonate	NO_3^- nitrate		

Describe the patterns you see in this chart.

PO_4^{3-} phosphate	SO_4^{2-} sulfate	ClO_3^- chlorate
AsO_4^{3-} arsenate ▼	SeO_4^{2-} selenate ▼	BrO_3^- bromate
		IO_3^- iodate ▼

Another pattern - Change the number of oxygen atoms from the –ate ion

	Prefix	Root	Suffix
Add 1 oxygen	per-	_root_	-ate
--		_root_	-ate
Remove 1 oxygen		_root_	-ite
Remove 2 oxygens	hypo-	_root_	-ite

# of oxygen atoms ↑

Examples:

ClO_4^-	perchlorate	IO_4^-	periodate	BrO_4^-		SO_4^{2-}	sulfate			PO_4^{3-}	phosphate
ClO_3^-	_chlorate_	IO_3^-	_iodate_	BrO_3^-	_bromate_	SO_3^{2-}	sulfite	NO_3^-	nitrate	PO_3^{3-}	phosphite
ClO_2^-	chlorite	IO_2^-		BrO_2^-				NO_2^-	nitrite		
ClO^-	hypochlorite	IO^-		BrO^-							

Describe the patterns you see in the chart above.

Add a hydrogen ion (proton) to the ion:

HCO_3^-	bicarbonate (or) hydrogen carbonate	HSO_3^-	bisulfite (or) hydrogen sulfite
HPO_4^{2-}	hydrogen phosphate	$H_2PO_4^-$	dihydrogen phosphate

Others to know:

Cations		Anions		Anions	
NH_4^+	ammonium	$C_2H_3O_2^-$	acetate	OH^-	hydroxide
H_3O^+	hydronium	CrO_4^{2-}	chromate	MnO_4^-	permanganate
		$Cr_2O_7^{2-}$	dichromate	O_2^{2-}	peroxide
		$C_2O_4^{2-}$	oxalate	CN^-	cyanide