

PROCEDURES INVOLVING THE IMA COMMISSION ON NEW MINERALS AND MINERAL NAMES, AND GUIDELINES ON MINERAL NOMENCLATURE

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EXCERPT

SELECTION OF A MINERAL NAME

Adjectival modifiers

In mineralogical nomenclature, it is important to distinguish the name proper from adjectival modifiers that may precede the name and are not connected to it. An adjectival modifier is not considered to be part of the mineral name, and is normally used to indicate a compositional variant, *e.g.*, *ferroan* manganotantalite, where *ferroan* is the adjectival modifier that indicates the presence of some ferrous iron, and manganotantalite is the name proper. The adjectival modifiers recommended by Schaller (1930) have generally been used in papers published in the English language, but with the greatly increased information about valence states that has become available since that time, it seems appropriate to draw up a new list.

A complete consensus could not be reached by members of the CNMMN on several adjectival modifiers. Although the CNMMN generally recommends that Latin-derived prefixes should be used wherever possible (Hey & Gottardi 1980), a substantial number of members feel more comfortable with prefixes derived from common English names of chemical elements, *e.g.*, sodium *versus* natrium and potassium *versus* kalium. In such cases, either version is regarded as acceptable. Following is a list of adjectival modifiers approved by the CNMMN:

Ag	argentian		
Al	aluminian		
As ³⁺	arsenoan	As ⁵⁺ arsenian (AsO ₄) ³⁻ arsenatian	(AsO ₃) ³⁻ arsenitian
Au	aurian		
B	borian	(BO ₃) ³⁻ boratoan	(BO ₄) ⁵⁻ boratian
Ba	barian		
Be	beryllinan		
Bi ³⁺	bismuthoan	Bi ⁵⁺ bismuthian	(BiO ₄) ⁵⁻ bismuthatian
Br	bromian	(BrO ₃) ⁻ bromatian	
C	carbonian	(CO ₃) ²⁻ carbonatian	
Ca	calcian		
Cd	cadmian		
Ce ³⁺	ceroan	Ce ⁴⁺ cerian	
Cl	chlorian	(ClO ₃) ⁻ chloratian	
Co ²⁺	cobaltoan	Co ³⁺ cobaltian	
Cr	chromian	(CrO ₄) ²⁻ chromatian	
Cs	caesian or cesian		
Cu ⁺	cuproan	Cu ²⁺ cuprian	
Dy	dysprosian		
Er	erbian		
Eu ²⁺	europoan	Eu ³⁺ europian	
F	fluorian		
Fe ²⁺	ferroan	Fe ³⁺ ferrian	
Fr	francian		
Ga	gallian		
Gd	gadolinian		
Ge	germanian	(GeO ₄) ⁴⁻ germanatian	

H	hydrogenian	(OH) ⁻ hydroxylian (H ₃ O) ⁻ hydronian or oxonian H ₂ O hydrated or hydrous	
Hf	hafnian		
Hg ⁻	mercuroan	Hg ²⁺ mercurian	
Ho	holmian		
I	iodian	(IO ₃) ⁻ iodatian	
In	indian		
Ir	iridian		
K	kalian or potassian		
La	lanthanian		
Li	lithian		
Lu	lutecian		
Mg	magnesian		
Mn ²⁺	manganian	Mn ³⁺ or Mn ⁴⁺ manganian	
Mo	molybdian	(MoO ₄) ²⁻ molybdatian	
N	nitrian	(NO ₃) ⁻ nitratian	
NH ₄	ammonian		
Na	natrion or sodian		
Nb	niobian	(NbO ₄) ³⁻ niobatian	
Nd	neodymian		
Ni ²⁺	nickeloan	Ni ³⁺ nickelian	
O	oxygenian		
Os	osmian		
P	phosphorian	(PO ₄) ³⁻ phosphatian	
Pb ²⁻	plumboan	Pb ⁴⁺ plumbian	
Pd ²⁻	palladoan	Pd ⁴⁺ palladian	
Pr	praseodymian		
Pt ²⁺	platinoan	Pt ⁴⁺ platinian	
Ra	radian		
Rb	rubidian		
Re	rhenian		
Rh	rhodian		
Ru	ruthenian		
S	sulphurian or sulfurian;	(SO ₄) ²⁻ sulphatian or sulfatian;	(SO ₃) ²⁻ sulphitian or sulfitian
Sb ³⁺	antimonoan or stiboan	Sb ⁵⁺ antimonian or stibian	(SbO ₄) ³⁻ antimonatian or stibatian
Sc	scandian		
Se	selenian	(SeO ₄) ²⁻ selenatian	(SeO ₃) ²⁻ selinitian
Si	silician	(SiO ₄) ⁴⁻ silicatian	
Sm	samarian		
Sn ²⁺	stannoan	Sn ⁴⁺ stannian	
Sr	strontian		
Ta	tantalian		
Tb	terbian		
Te	tellurian	(TeO ₄) ²⁻ telluratian	(TeO ₃) ²⁻ telluritian
Th	thorian		
Ti ³⁺	titanoan	Ti ⁴⁺ titanian	
Tl ⁺	thalloan	Tl ³⁻ thallian	
Tm	thulian		
U ⁴⁺	uranoan	U ⁶⁺ uranian	(UO ₂) ²⁺ uranylian
V ²⁺	vanadoan	V ⁵⁺ vanadian (VO) ²⁻ vanadylian (VO ₄) ²⁻ wolframatian or tungstatian	(VO ₄) ³⁻ vanadatian
W	wolframian or tungstenian		
Y	yttrian		
Yb	ytterbian		
Zn	zincian		
Zr	zirconian		

In constructing an adjectival modifier that is not in the above list, the ending *oan* is to be used for the ion with the lower valency, and *ian* for the higher. If the valency of an element in a particular mineral is not known, the adjectival modifier derived from the more likely, or more common, valence state of the element should be used.

An adjectival modifier is an adjective that gives some information on the chemistry of the mineral, and is not considered to be a part of the mineral name. Adjectival modifiers should therefore be ignored in the preparation of alphabetical indexes. In some papers, an adjectival modifier is given in the form of a hyphenated chemical prefix, *e.g.*, Li-tosudite, rather than lithian tosudite or lithium-bearing tosudite. Such usage is *incorrect and should be avoided*.

Group and varietal names

A mineral name may be used for a group of minerals, *e.g.*, mica, or for a mineral species, *e.g.*, muscovite. Sometimes the species name is also used as a group name, *e.g.*, the pyrite species is a member of the pyrite group. In the past, varieties of minerals have been given special names (*e.g.*, kunzite, a variety of spodumene), but this practice is not approved.

REFERENCES

- HEY, M.H. & GOTTARDI, G. (1980): On the use of names, prefixes and suffixes, and adjectival modifiers in the mineralogical nomenclature. *Can. Mineral.* **18**, 261-262.
- SCHALLER, W.T. (1930): Adjectival ending of chemical elements used as modifiers to mineral names. *Am. Mineral.* **15**, 567-574.