Manganochromite $(Mn^{2+}, Fe^{2+})(Cr^{3+}, V^{3+})_2O_4$

Crystal Data: Cubic. *Point Group:* $4/m\ \overline{3}\ 2/m$. As six-sided grains, to 10 μm.

Physical Properties: Hardness = n.d. VHN = 1000(70) (100 g load). D(meas.) = n.d. D(calc.) = 4.86–4.90

Optical Properties: Semitransparent. *Color:* Brownish gray in reflected light. *Optical Class:* Isotropic.
R: (470) 16.8, (546) 16.5, (589) 16.5, (650) 16.3

Cell Data: *Space Group:* $Fd3m$. a = 8.47 Z = 8

X-ray Powder Pattern: Nairne deposit, South Australia.
2.55 (s), 1.63 (s), 1.50 (s), 4.89 (w), 2.99 (w), 2.44 (w), 1.73 (w)

Chemistry:

	(1)	(2)
TiO_2		0.2
V_2O_3	1.7	30.5
Cr_2O_3	62.3	35.9
FeO	9.4	5.3
MnO	24.0	26.3
ZnO	1.7	0.7
Total	[99.1]	98.9

(1) Nairne deposit, South Australia; original total given as 99.0%; corresponds to $(Mn_{0.77}Fe_{0.30}Zn_{0.05})_{\Sigma=1.12}(Cr_{1.88}V_{0.04})_{\Sigma=1.92}O_4$. (2) Sätra mine, Sweden; by electron microprobe, total Fe as FeO; corresponds to $(Mn_{0.83}Fe_{0.17}Zn_{0.02})_{\Sigma=1.02}(Cr_{1.06}V_{0.92}Ti_{0.01})_{\Sigma=1.99}O_4$.

Polymorphism & Series: Forms a series with vuorelainenite.

Mineral Group: Spinel group.

Occurrence: From an extension gash vein in a metamorphosed hydrothermal pyrite deposit (Nairne deposit, South Australia); in a metamorphosed iron sulfide deposit associated with submarine felsic volcanism (Sätra mine, Sweden); in sulfide nodules in an iron meteorite (Burkhala meteorite).

Association: Pyrrhotite, rutile, diopside (Nairne deposit, South Australia); vuorelainenite, sphalerite, alabandite (Sätra mine, Sweden); troilite, daubreelite, alabandite, zinc sulfides, olivine, pyroxene (Burkhala meteorite).

Distribution: From the Nairne deposit, near Brukunga, 47 km east of Adelaide, South Australia. In the Sätra mine, Doverstorp, Bergslagen metallic province, Sweden. Noted in the Burkhala meteorite.

Name: For MANGANese in its composition, and relation to *magnesiochromite*.

Type Material: Western Australian Museum, Perth, Australia, M.65.1991.

References: (1) Graham, J. (1978) Manganochromite, palladium antimonide, and some unusual mineral associations at the Nairne pyrite deposit, South Australia. Amer. Mineral., 63, 1166–1174. (2) Zakrzewski, M.A., E.A.J. Burke, and W.J. Lustenhouwer (1982) Vuorelainenite, a new spinel, and associated minerals from the Sätra (Doverstorp) pyrite deposit, central Sweden. Can. Mineral., 20, 281–290.