Lucchesiite $CaFe^{2+}_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3O$

Crystal Data: Hexagonal. *Point Group*: 3*m*. Crystals prismatic, to 5 cm.

Physical Properties: *Cleavage*: [Poor/indistinct on {0001}.] *Fracture*: Conchoidal. *Tenacity*: Brittle. Hardness = ~ 7 D(calc.) = 3.209 (Sri Lanka), 3.243 (Czech Republic)

Optical Properties: Transparent. *Color*: Black. *Streak*: Gray. *Luster*: Vitreous. *Optical Class*: Uniaxial (-). ω = 1.670(5) ε = 1.655(5) *Pleochroism*: *O* = very dark brown, *E* = light brown.

Cell Data: *Space Group*: *R*3*m*. *a* = 16.0018(7) *c* = 7.2149(3) Z = 3

X-ray Powder Pattern: Sri Lanka.
2.587 (100), 2.970 (99), 3.490 (72), 2.049 (69), 1.926 (43), 4.236 (42), 1.512 (42)

Chemistry:	(1)	(2)		(1)	(2)
SiO_2	34.03	33.46	MnO	0.05	0.20
TiO_2	2.53	0.64	ZnO	0.10	0.04
B_2O_3	[10.11]	[9.89]	CaO	3.74	2.62
Al_2O_3	26.48	27.00	Na_2O	0.89	1.32
V_2O_3	0.12	b.d.l.	K_2O	0.09	0.06
FeO_{total}	11.77	16.82	F	0.44	0.10
Fe_2O_3	[1.97]	[10.05]	H_2O	[2.67]	[2.27]
FeO	[10.00]	[7.77]	$-O = F_2$	0.19	0.04
MgO	6.73	3.59	Total	99.76	98.96

(1) Sri Lanka; average of 10 electron microprobe analyses supplemented by Mössbauer and FTIR spectrometry, H_2O, B_2O_3,Fe_2O_3 and FeO calculated; corresponds to $^{X}(Ca_{0.69}Na_{0.30}K_{0.02})_{\Sigma=1.01}$ $^{Y}(Fe^{2+}_{1.44}Mg_{0.72}Al_{0.48}Ti^{4+}_{0.33}V^{3+}_{0.02}Mn_{0.01}Zn_{0.01})_{\Sigma=3.00}$ $^{Z}(Al_{4.74}Mg_{1.01}Fe^{3+}_{0.25})_{\Sigma=6.00}[^{T}(Si_{5.85}Al_{0.15})_{\Sigma=6.00}O_{18}]$ $(BO_3)_3$ $^{V}(OH)_3$ $^{W}[O_{0.69}F_{0.24}(OH)_{0.07}]_{\Sigma=1.00}$. (2) Czech Republic; average electron microprobe analysis supplemented by Mössbauer and FTIR spectrometry, H_2O, B_2O_3 and Fe_2O_3:FeO calculated; corresponds to $^{X}(Ca_{0.49}Na_{0.45}\square_{0.05}K_{0.01})_{\Sigma=1.00}$ $^{Y}(Fe^{2+}_{1.14}Fe^{3+}_{0.95}Mg_{0.42}Al_{0.37}Ti^{4+}_{0.08}Mn_{0.03}Zn_{0.01})_{\Sigma=3.00}$ $^{Z}(Al_{5.11}Mg_{0.52}Fe^{3+}_{0.38})_{\Sigma=6.00}[^{T}(Si_{5.88}Al_{0.12})_{\Sigma=6.00}O_{18}](BO_3)_3$ $^{V}[(OH)_{2.66}O_{0.34}]_{\Sigma=3.00}$ $^{W}(O_{0.94}F_{0.06})_{\Sigma=1.00}$.

Polymorphism & Series: Solid-solution with feruvite.

Mineral Group: Tourmaline supergroup, calcic group, oxy-subgroup.

Occurrence: As graphic intergrowths, in the central parts of a contaminated anatectic pegmatite dike (Czech Republic). In gem-bearing alluvial gravels ("illam") (Sri Lanka).

Association: Ca-rich schorl, plagioclase (An_{30-42}), K-feldspar, quartz (Czech Republic).

Distribution: Ratnapura, Sri Lanka and Mirošov, near Strážek, western Moravia, Czech Republic.

Name: Honors Sergio Lucchesi (1958-2010), professor of mineralogy, Sapienza University, Rome, Italy, for his contributions to the study of tourmaline and spinel crystal chemistry.

Type Material: Museum of Mineralogy, Earth Sciences Department, Sapienza University, Rome, Italy (33198/1) and the Moravian Museum, Department of Mineralogy and Petrography, Brno, Czech Republic (A11137 and A11138).

References: (1) Bosi, F., H. Skogby, M.E. Ciriotti, P. Gadas, M. Novák, J. Cempírek, D. Všianský, and J. Filip (2017) Lucchesiite, $CaFe^{2+}_3Al_6(Si_6O_{18})(BO_3)_3(OH)_3O$, a new mineral species of the tourmaline supergroup. Mineral. Mag., 81(1), 1-14. (2) Gadas, P., M. Novák, J. Cempírek, J. Filip, M. Vašinová Galiová, L.A. Groat, and D. Všianský (2014) Mineral assemblages, compositional variation, and crystal structure of feruvitic tourmaline from a contaminated anatectic pegmatite at Mirošov near Strážek, Moldanubian Zone, Czech Republic. Can. Mineral., 52, 285-301. (3) (2017) Amer. Mineral., 102, 919-920 (abs. refs. 1 & 2).