

Table A1: Major element analyses of the Tanzanian opx, the green enstatite and the orthopyroxene EC_11 (EPMA)

Sample	SiO ₂	TiO ₂	Cr ₂ O ₃	Al ₂ O ₃	Fe ₂ O ₃	FeO	MnO	NiO	MgO	CaO	Na ₂ O	K ₂ O	Total	Mg#
Tanz_opx	58.2 (0.106)	0.038 (0.008)	0.006 (0.010)	0.104 (0.005)	0	5.90 (0.044)	0.218 (0.015)	0.011 (0.011)	35.0 (0.106)	0.131 (0.005)	0.032 (0.005)	0.002 (0.004)	99.63 (0.219)	91.4 (0.058)
Tanz_ref_A	57.1 (0.322)	0.035 (0.010)	0.035 (0.011)	0.169 (0.009)	0.277 (0.023)	5.61 (0.041)	0.211 (0.013)	0.013 (0.011)	35.8 (0.210)	0.162 (0.007)	0.043 (0.005)	0.005 (0.006)	99.44 (0.495)	91.9 (0.087)
Tanz_ref_B	57.2 (0.239)	0.033 (0.011)	0.021 (0.007)	0.118 (0.017)	0.199 (0.030)	5.61 (0.066)	0.223 (0.013)	0.006 (0.007)	35.8 (0.167)	0.158 (0.005)	0.039 (0.006)	0.001 (0.002)	99.39 (0.368)	91.9 (0.108)
Tanz_ref_C	57.2 (0.196)	0.025 (0.011)	0.027 (0.007)	0.091 (0.017)	0.157 (0.031)	5.60 (0.068)	0.215 (0.008)	0.007 (0.009)	36.0 (0.141)	0.168 (0.007)	0.035 (0.003)	0.002 (0.003)	99.51 (0.332)	92.0 (0.083)
Tanz_ref_D	57.0 (0.099)	0.021 (0.006)	0.033 (0.012)	0.101 (0.008)	0.211 (0.006)	5.46 (0.088)	0.218 (0.007)	0.007 (0.009)	35.8 (0.031)	0.155 (0.007)	0.047 (0.006)	0.004 (0.004)	99.00 (0.114)	92.1 (0.121)
Tanz_ref_E	56.9 (0.205)	0.037 (0.007)	0.022 (0.014)	0.125 (0.013)	0.194 (0.042)	5.83 (0.212)	0.213 (0.016)	0.014 (0.010)	35.9 (0.129)	0.158 (0.007)	0.035 (0.007)	0.002 (0.002)	99.39 (0.421)	91.6 (0.278)
Tanz_ref_F	57.0 (0.156)	0.024 (0.010)	0.028 (0.013)	0.088 (0.009)	0.156 (0.028)	5.91 (0.100)	0.216 (0.018)	0.011 (0.011)	36.1 (0.162)	0.172 (0.009)	0.036 (0.005)	0.002 (0.003)	99.71 (0.310)	91.6 (0.116)
Green_ref_A	57.8 (0.164)	0.005 (0.005)	0.204 (0.010)	0.383 (0.019)	0.395 (0.035)	4.87 (0.069)	0.121 (0.008)	0.051 (0.012)	36.4 (0.226)	0.539 (0.009)	0.006 (0.004)	0.002 (0.002)	100.8 (0.303)	92.5 (0.095)
Green_ref_B	56.9 (0.215)	0.003 (0.004)	0.188 (0.016)	0.421 (0.011)	0.476 (0.025)	4.78 (0.075)	0.123 (0.009)	0.039 (0.020)	35.9 (0.211)	0.537 (0.010)	0.006 (0.005)	0.002 (0.003)	99.4 (0.385)	92.4 (0.109)
Green_ref_C	56.6 (0.089)	0.004 (0.005)	0.178 (0.007)	0.379 (0.027)	0.423 (0.040)	4.78 (0.060)	0.121 (0.013)	0.052 (0.015)	36.3 (0.153)	0.507 (0.032)	0.006 (0.004)	0.004 (0.005)	99.36 (0.218)	92.6 (0.064)
Green_ref_D	56.9 (0.163)	0.003 (0.004)	0.200 (0.009)	0.420 (0.010)	0.466 (0.018)	4.80 (0.035)	0.128 (0.010)	0.055 (0.015)	36.1 (0.102)	0.537 (0.010)	0.007 (0.005)	0.003 (0.004)	99.7 (0.250)	92.4 (0.046)
EC_11	55.5 (0.118)	0.051 (0.004)	0.741 (0.032)	3.75 (0.113)	0	5.72 (0.058)	0.123 (0.018)	0.090 (0.014)	32.7 (0.053)	0.0606 (0.130)	0.006 (0.002)	0.005 (0.002)	99.3 (0.046)	91.1 (0.094)

Table A2: Trace element analyses of the Tanzanian opx and the green enstatite (LA-ICP-MS)

Tanzanian opx			Green enstatite			NIST 612	
El.	Concentration (wt. ppm)	Detection limit (wt. ppm)	El.	Concentration (wt. ppm)	Detection limit (wt. ppm)	Measured NIST 612	Published values* (wt. ppm)
Li	13.5 (1.5)	0.0061	Li	23 (0.86)	0.063	41.5 (0.24)	40 (2)
B	10.0 (2.6)	0.022	B	1.3 (0.06)	0.021	34.7 (0.34)	35 (3)
Sc	5.28 (0.84)	0.006	Sc	10 (0.20)	0.005	41.1 (0.21)	40 (3)
V	11.2 (2.4)	0.003	V	30 (0.55)	0.003	39.2 (0.10)	39 (2)

Cr	218 (23)	0.042	Cr	1485 (22)	0.04	39.9 (0.37)	37 (2)
Co	24.4 (1.34)	0.002	Co	40.7 (0.67)	0.002	35.3 (0.16)	35 (2)
Ni	52.5 (0.99)	0.261	Ni	352 (5.0)	0.239	38.4 (1.2)	39 (2)
Cu	3.22 (0.08)	0.006	Cu	0.10 (0.01)	0.006	36.7 (0.08)	38 (3)
Zn	179 (3.9)	0.073	Zn	41.8 (1.8)	0.067	37.9 (0.89)	40 (2)
Ga	1.04 (0.28)	0.004	Ga	0.75 (0.03)	0.003	36.2 (0.27)	38 (2)
Rb	<0.004	0.002	Rb	0	0.002	31.6 (0.07)	33 (2)
Sr	0.004 (0.003)	0.001	Sr	0.06 (0.003)	0.001	76.2 (0.24)	77 (4)
Y	0.16 (0.04)	0.001	Y	0.15 (0.01)	0.0004	38.3 (0.20)	38 (3)
Zr	0.08 (0.02)	0.007	Zr	0.09 (0.01)	0.007	36.0 (0.21)	38 (3)
Nb	0.001 (0.0004)	0.001	Nb	0.003 (0.001)	0.0001	38.1 (0.08)	39 (3)
Cs	< 0.002	0.001	Cs	< 0.002	0.001	41.6 (0.06)	43 (4)
Ba	< 0.002	0.001	Ba	0.0003 (0.0006)	0.001	37.7 (0.40)	39 (2)
La	0.0009 (0.0006)	0.0002	La	0.012 (0.001)	0.0001	35.8 (0.2)	37 (2)
Ce	0.005 (0.002)	0.0002	Ce	0.041 (0.003)	0.0001	38.3 (0.18)	38 (2)
Pr	0.0014 (0.0005)	0.0001	Pr	0.06 (0.0007)	0.00005	37.2 (0.09)	38 (3)
Nd	0.009 (0.003)	0.0006	Nd	0.031 (0.004)	0.0003	35.2 (0.34)	36 (2)
Sm	0.006 (0.002)	0.0005	Sm	0.004 (0.003)	0.0004	36.7 (0.40)	38 (2)
Eu	0.003 (0.001)	0.0003	Eu	0.004 (0.0009)	0.0001	34.4 (0.12)	36 (2)
Gd	0.001 (0.005)	0.001	Gd	0.017 (0.003)	0.001	37.0 (0.09)	37 (3)
Tb	0.003 (0.0009)	0.0001	Tb	0.004 (0.0005)	0.00005	36.0 (0.08)	38 (3)
Dy	0.024 (0.006)	0.0001	Dy	0.025 (0.003)	0.0003	36.0 (0.16)	36 (2)
Ho	0.007 (0.001)	0.00006	Ho	0.005 (0.0008)	0.00008	37.9 (0.09)	39 (2)
Er	0.026 (0.007)	0.0004	Er	0.0015 (0.002)	0.0002	37.4 (0.30)	38 (2)
Yb	0.064 (0.015)	0.0004	Yb	0.023 (0.003)	0.0004	36.0 (0.13)	39 (2)
Lu	0.012 (0.003)	0.00009	Lu	0.005 (0.0007)	0.00006	37.7 (0.28)	37 (3)
Hf	0.008 (0.002)	0.0004	Hf	0.005 (0.001)	0.0002	34.8 (0.33)	36 (3)
Ta	0	0.0002	Ta	0.0003 (0.0006)	0.0001	39.8 (0.13)	37 (3)
Pb	0.001 (0.0004)	0.0006	Pb	0.002 (0.0003)	0.0004	37.0 (0.31)	39 (3)
Th	0.002 (0.0007)	0.00004	Th	0.003 (0.0005)	0.00002	37.2 (0.24)	38 (2)
U	0	0.00006	U	0.015 (0.001)	0.00001	37.2 (0.20)	38 (3)

* values from Jochum et al. (2011)