

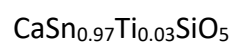
## Supplementary data

Table S1: Electron Microprobe analysis (wt%) of malayaite from El Hammam mine, Morocco.

Probe conditions: 15kV, 20nA

Oxide	Mean	Range (100pts)	Std. Dev.	Probe Standard	Wavelength
SiO <sub>2</sub>	22.83	22.21 – 24.31	0.43	Wollastonite	Si K $\alpha$
CaO	21.33	20.71 – 22.74	0.41	Wollastonite	Ca K $\beta$
SnO <sub>2</sub>	55.68	45.27 – 57.56	2.56	SnO <sub>2</sub>	Sn L $\alpha$
TiO <sub>2</sub>	0.83	0.0 – 7.55	1.82	MnTiO <sub>3</sub>	Ti K $\alpha$
Total	100.67				

Empirical formula normalized to 5 anions:



Standard compositions:

Wollastonite: 34.5% Ca, 24.18% Si, 41.32% O

SnO<sub>2</sub>: 78.77% Sn, 21.23% O

MnTiO<sub>3</sub>: 36.42% Mn, 31.76% Ti, 31.82% O

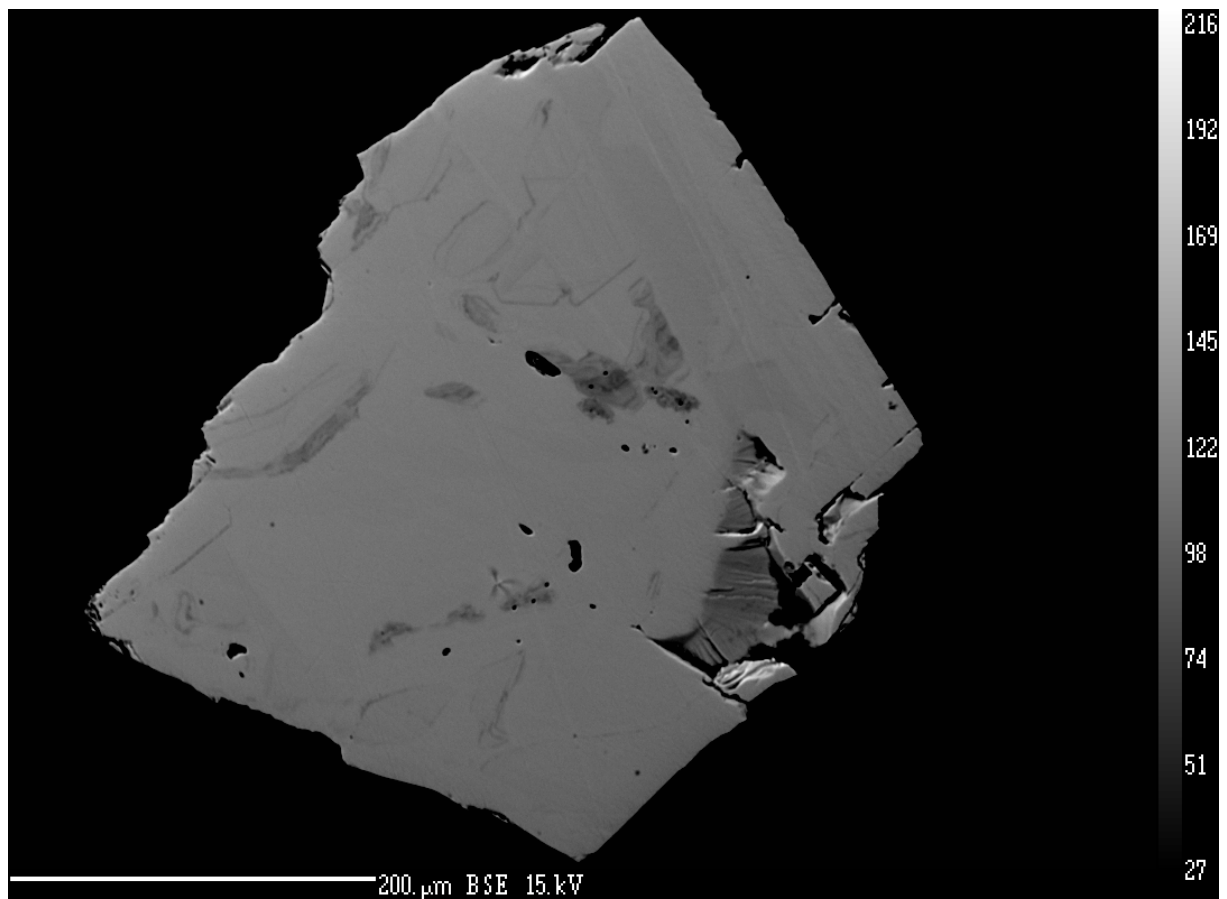


Figure S2: Electron backscattering image of the malayaite grain studied by electron microprobe analysis. Darker shaded areas indicate Ti substitution for Sn.

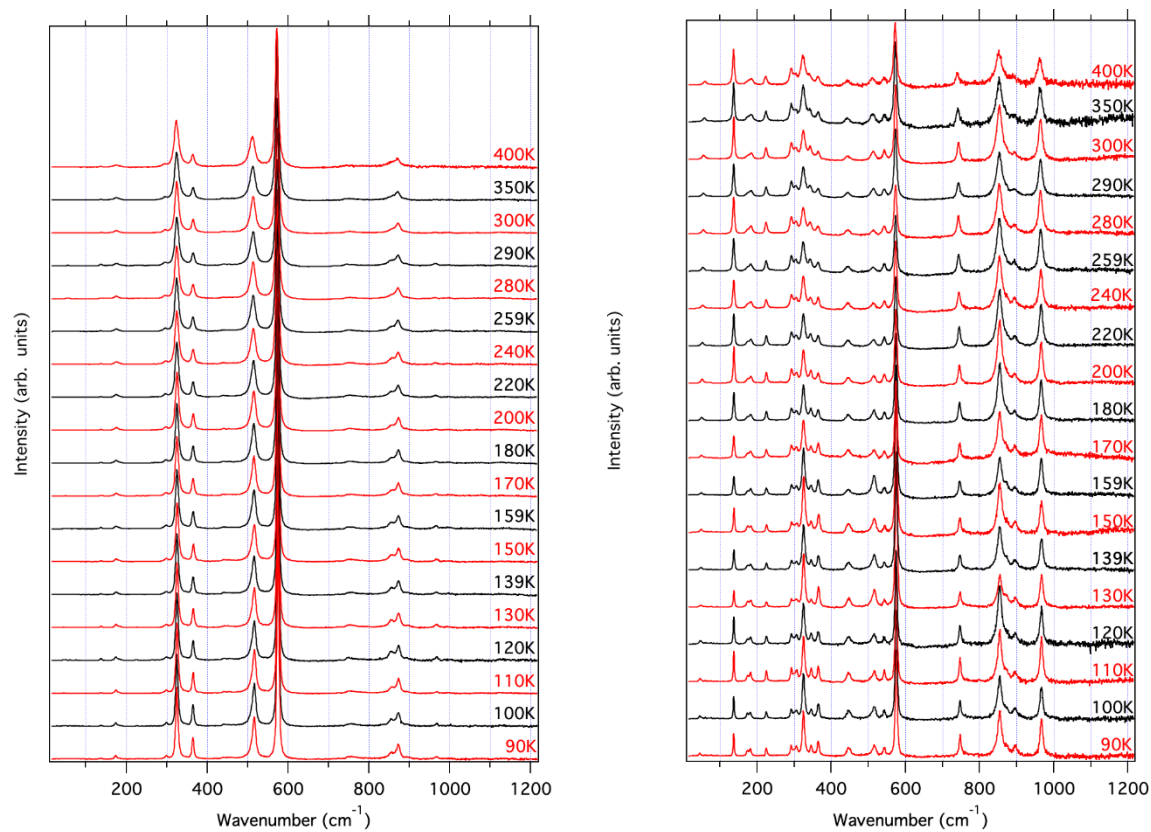


Figure S3: Parallel (left) and cross polarized (right) Raman spectra of malayaite as a function of temperature.