

Supplementary Materials for **Metamorphic records of multiple seismic cycles during subduction**

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- fig. S3. Color overlay x-ray count maps for major divalent elements in Garnet 1.5 from CA13-01.
- fig. S4. Color overlay x-ray count maps for major divalent elements in Garnet 1.6 from CA13-01.
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- fig. S12. Color overlay x-ray count maps for major divalent elements in Garnet 2.1 from CA13-05A.

- fig. S13. Color overlay x-ray count maps for major divalent elements in Garnet 2.2 from CA13-05A.
- fig. S14. Color overlay x-ray count maps for Mg in garnets from CA13-01 and CA13-05A.
- fig. S15. Color overlay x-ray count maps for Mn in garnets from CA13-01 and CA13-05A.
- fig. S16. Blowups of regions indicated by white rectangles in (top row) fig. S14 and (bottom row) fig. S15.
- References (71–83)

Other Supplementary Material for this manuscript includes the following:

(available at advances.sciencemag.org/cgi/content/full/4/3/eaag0234/DC1)

- Excel file

Color-enhanced wavelength-dispersive spectrometer x-ray count maps for Al, Ca, Fe, Mg and Mn in all garnets analyzed from Ring Mountain. Decreasing element content is indicated by yellow–green–blue–black color progression.

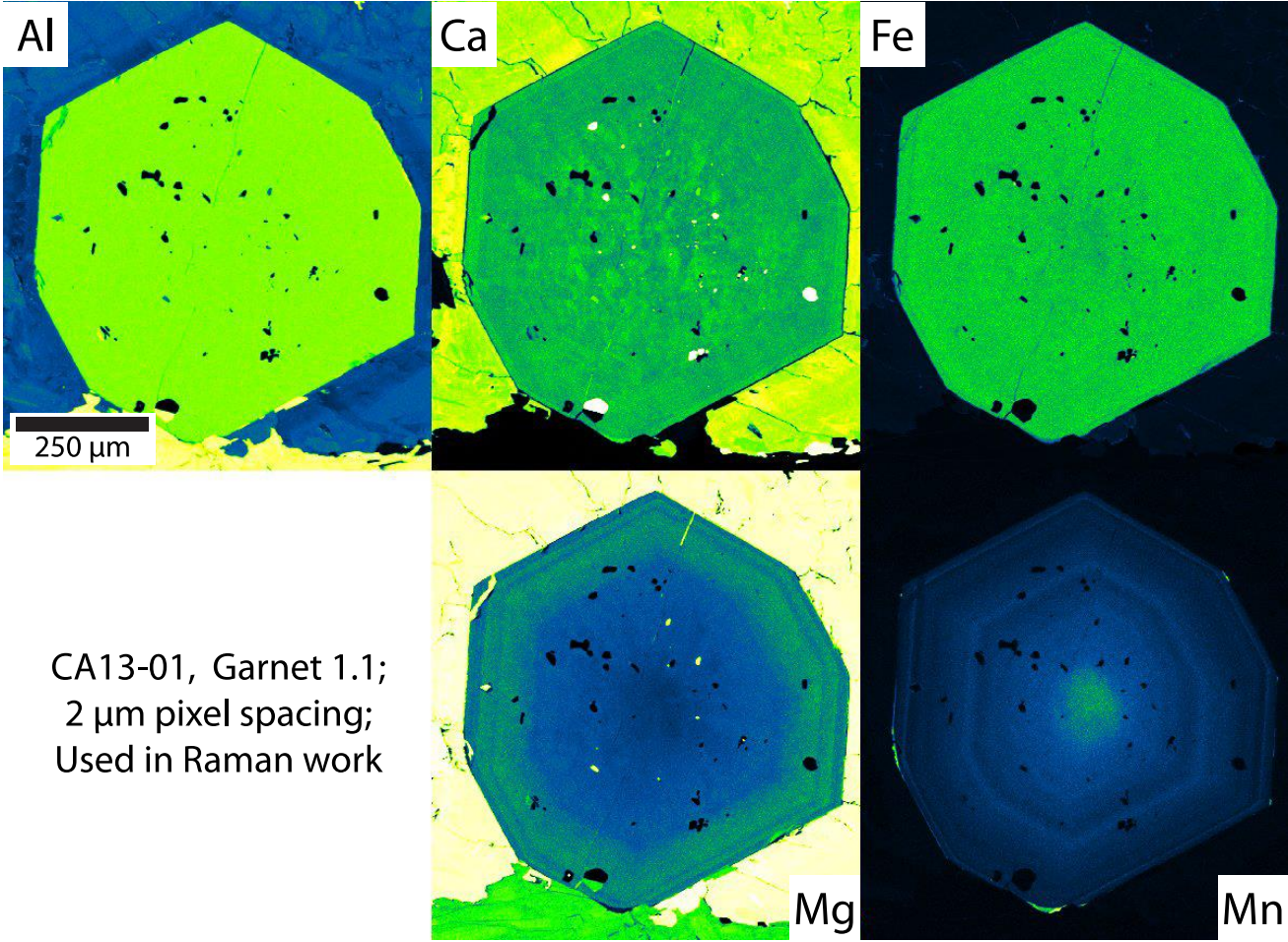


fig. S1. Color overlay x-ray count maps for major divalent elements in Garnet 1.1 from CA13-01.

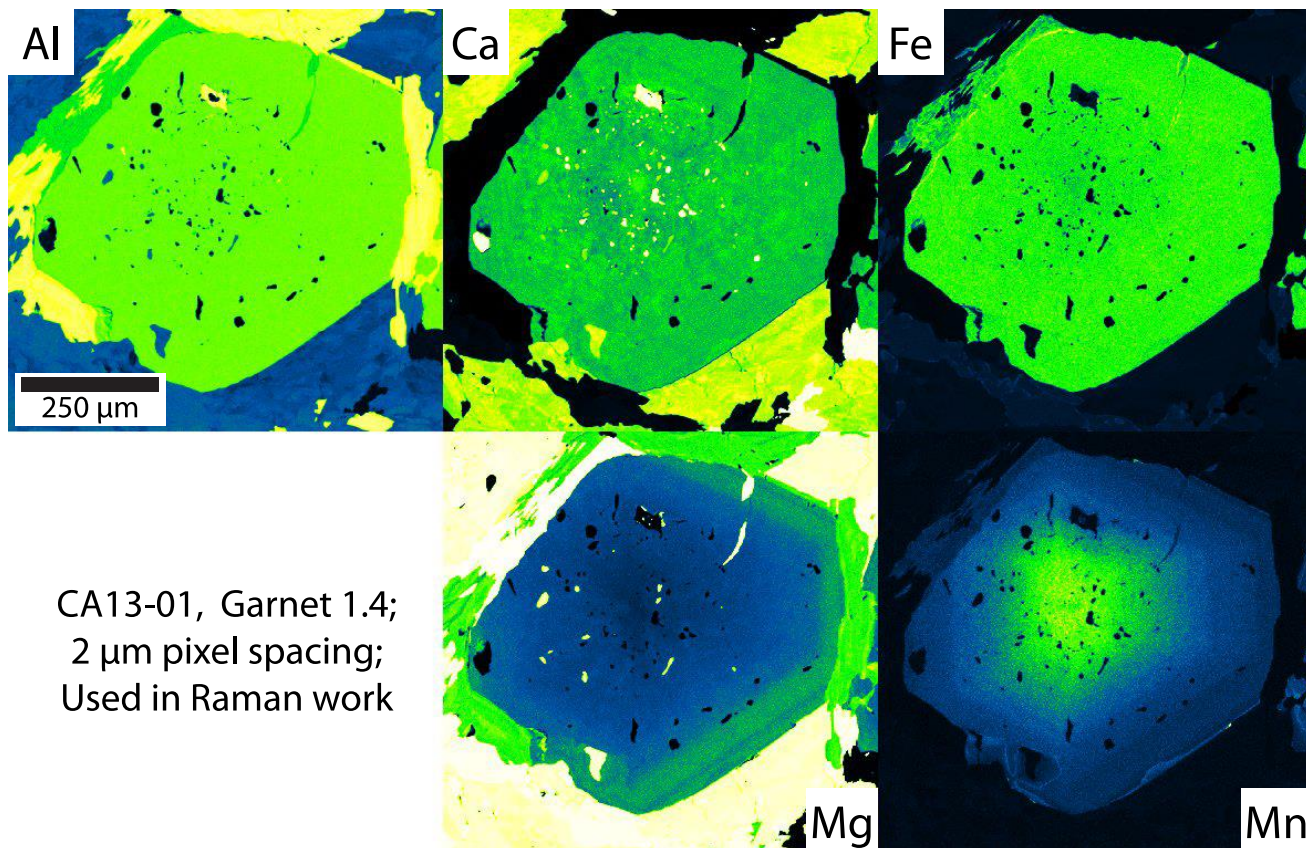


fig. S2. Color overlay x-ray count maps for major divalent elements in Garnet 1.4 from CA13-01.

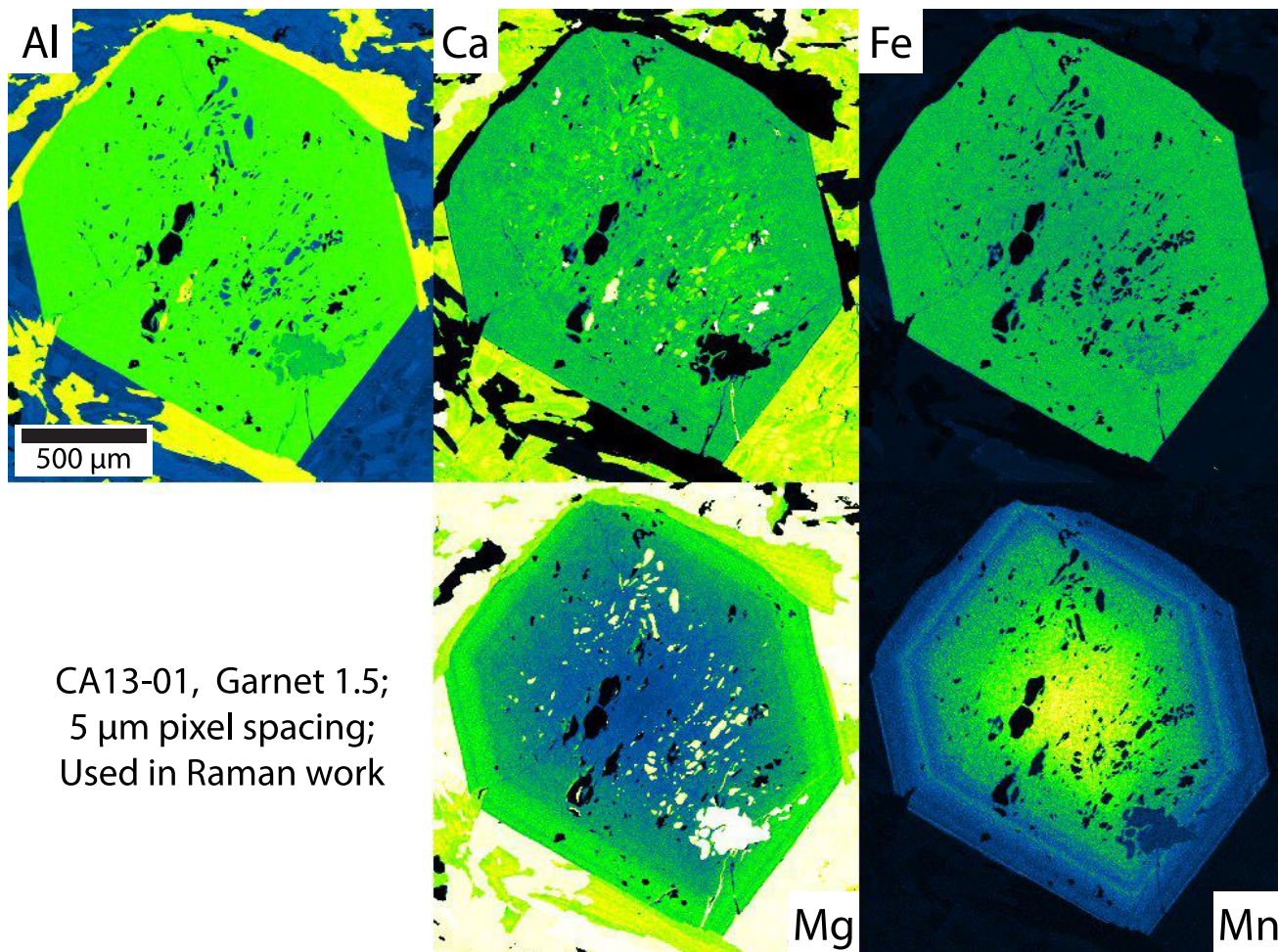


fig. S3. Color overlay x-ray count maps for major divalent elements in Garnet 1.5 from CA13-01.

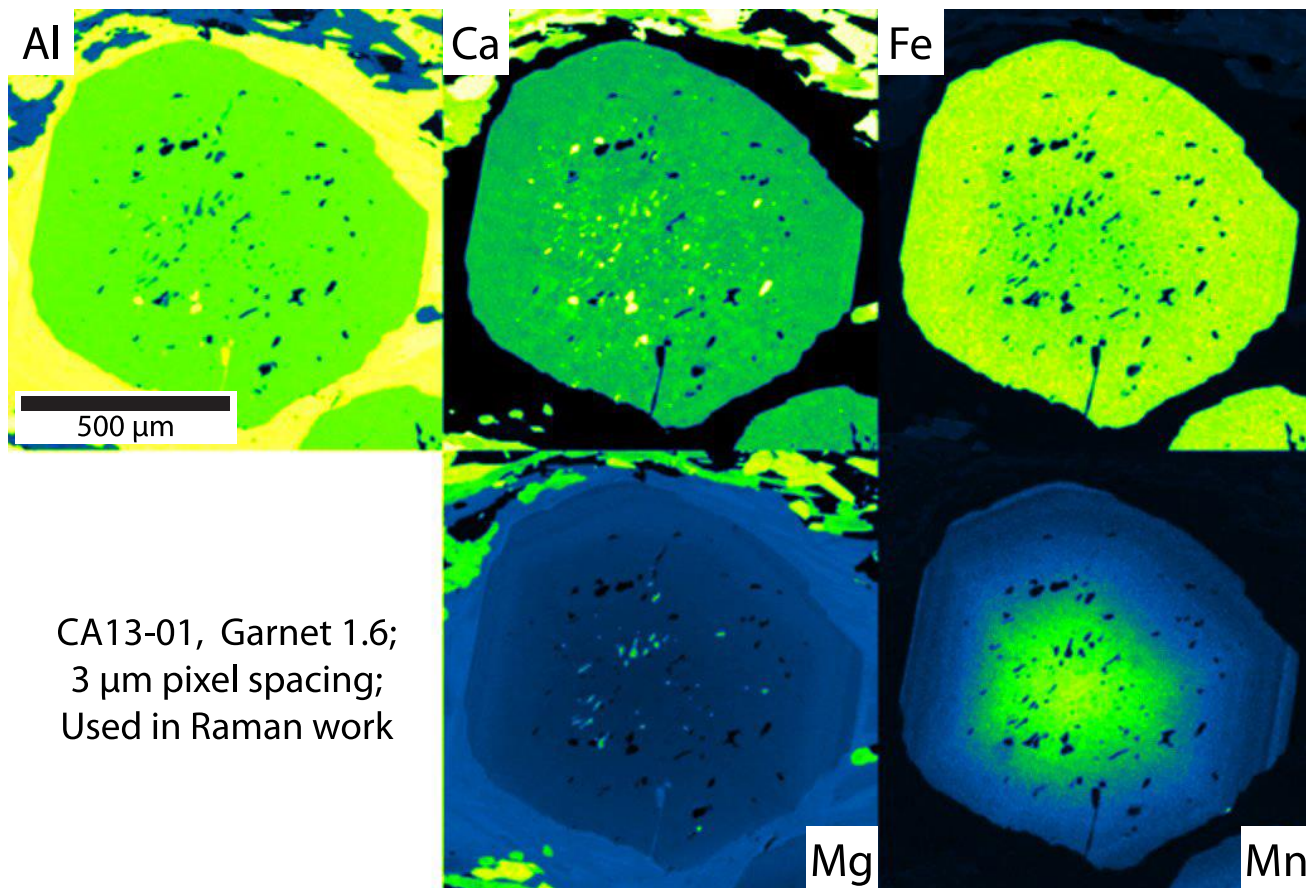


fig. S4. Color overlay x-ray count maps for major divalent elements in Garnet 1.6 from CA13-01.

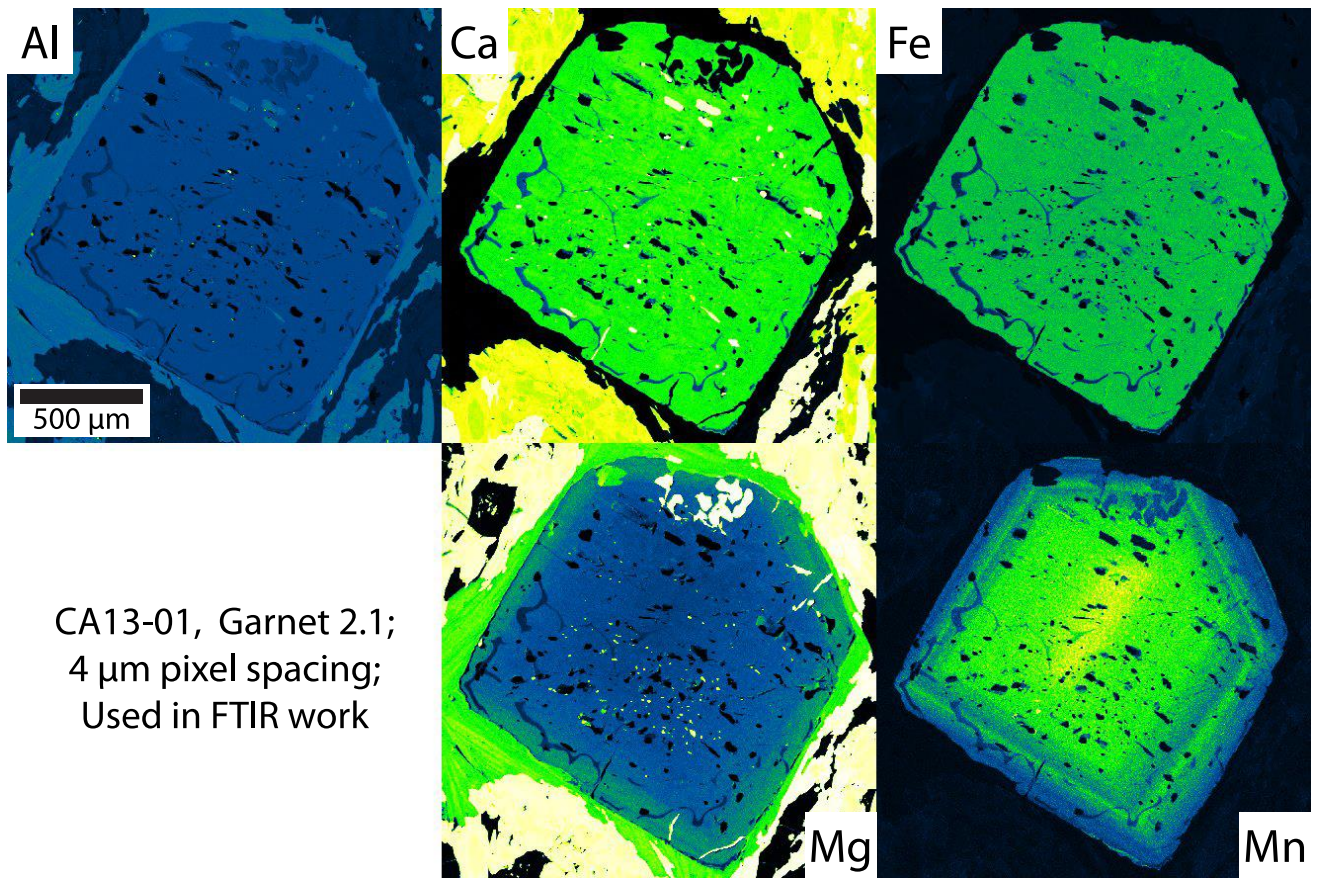


fig. S5. Color overlay x-ray count maps for major divalent elements in Garnet 2.1 from CA13-01.

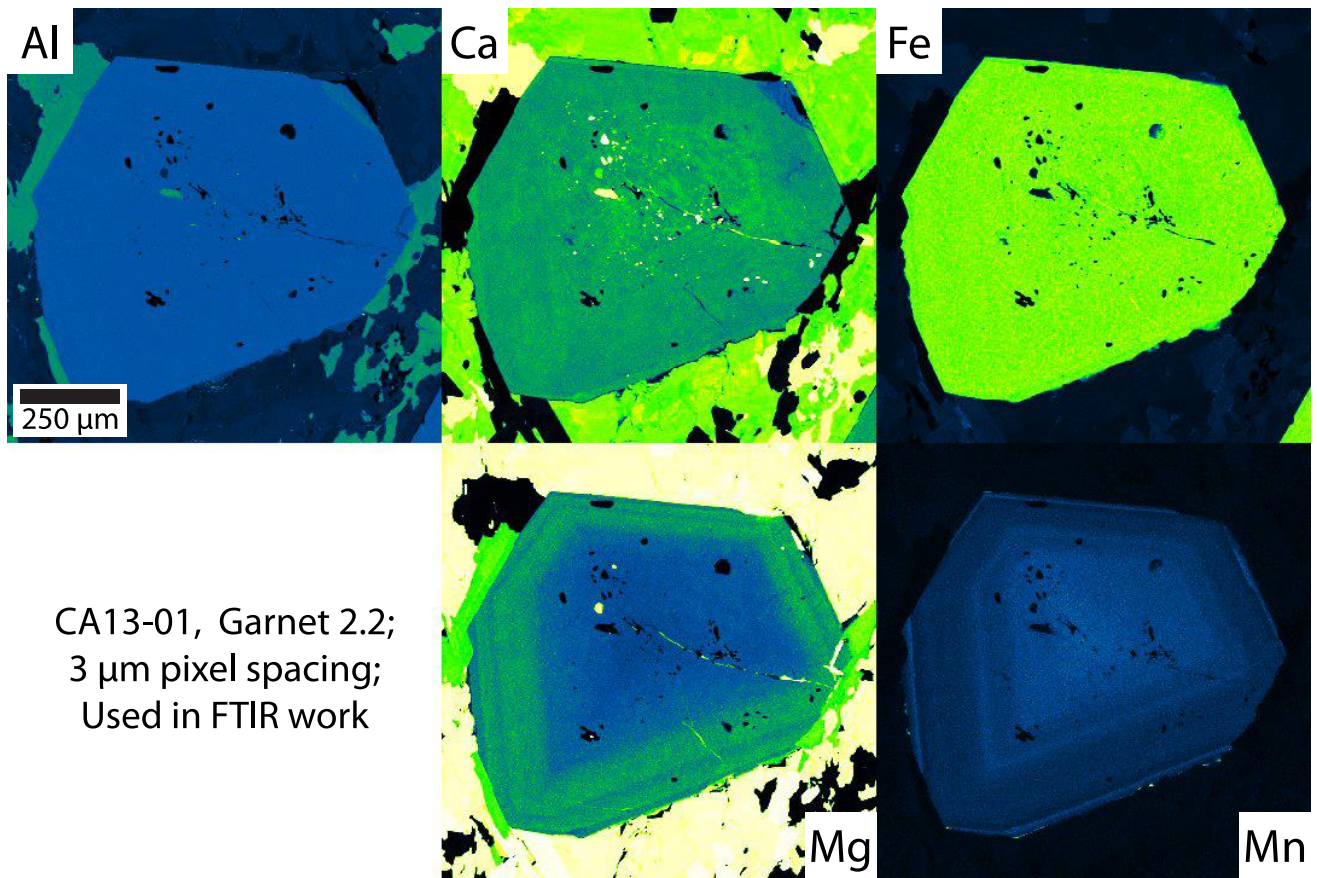


fig. S6. Color overlay x-ray count maps for major divalent elements in Garnet 2.2 from CA13-01.

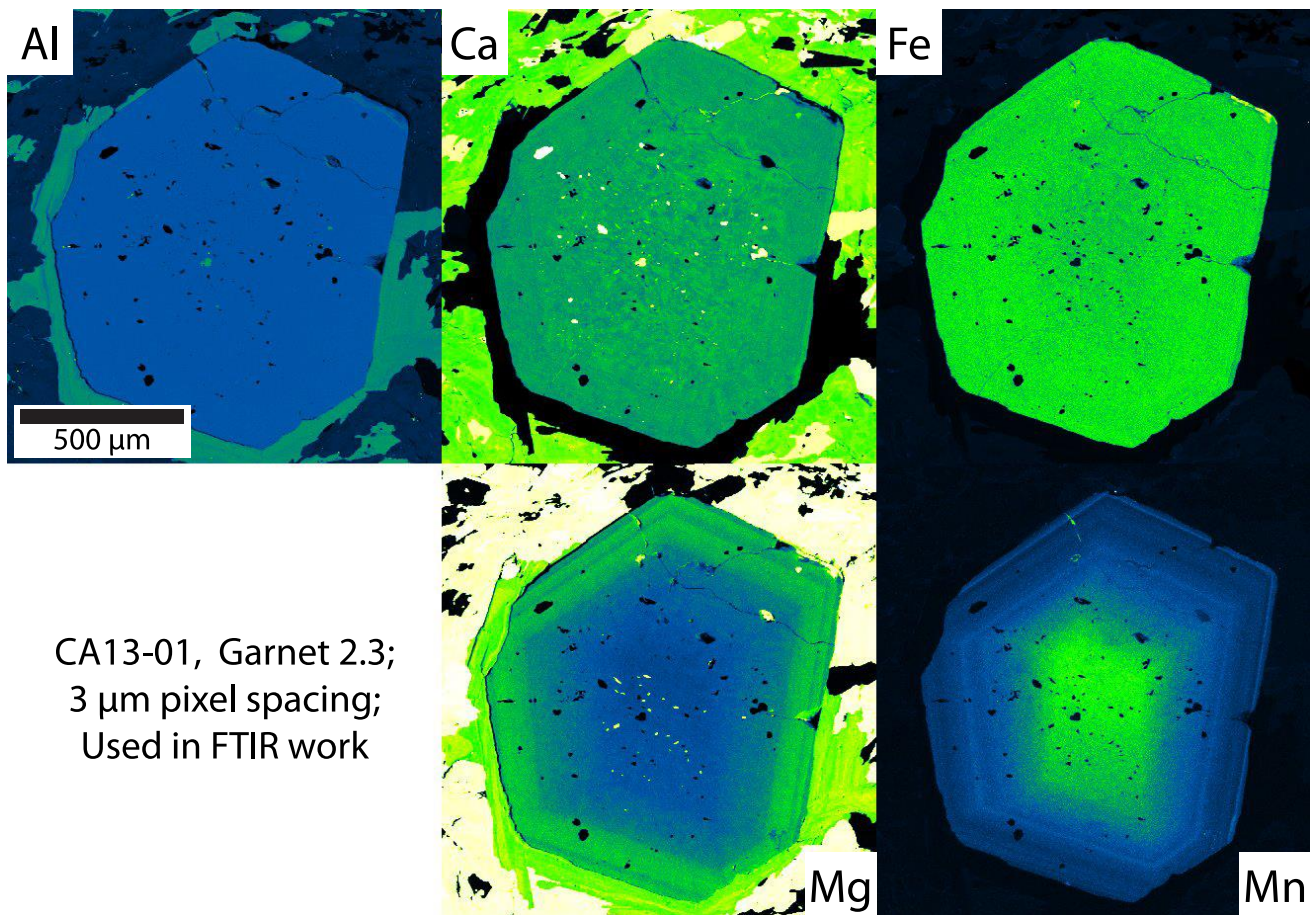


fig. S7. Color overlay x-ray count maps for major divalent elements in Garnet 2.3 from CA13-01.

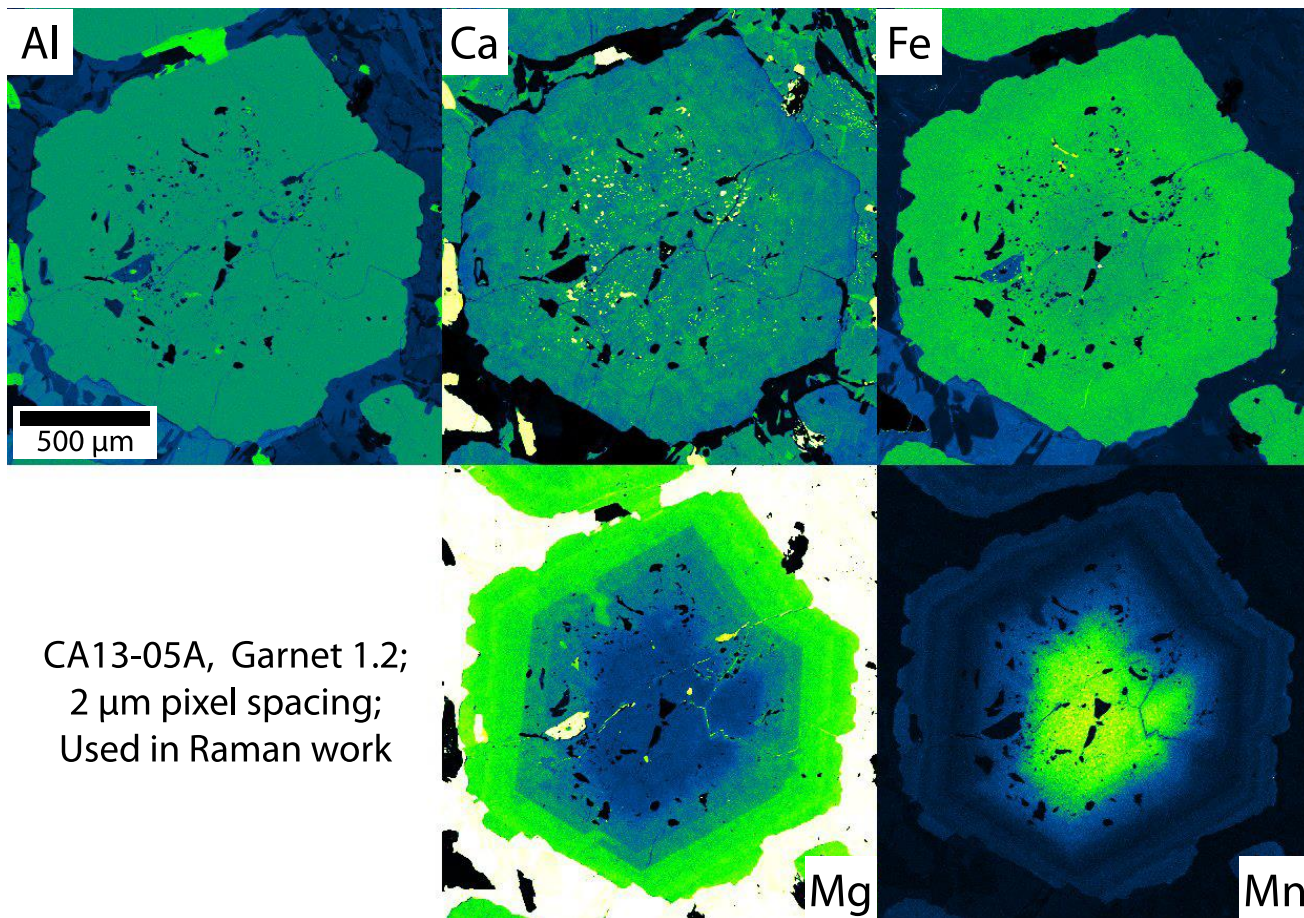
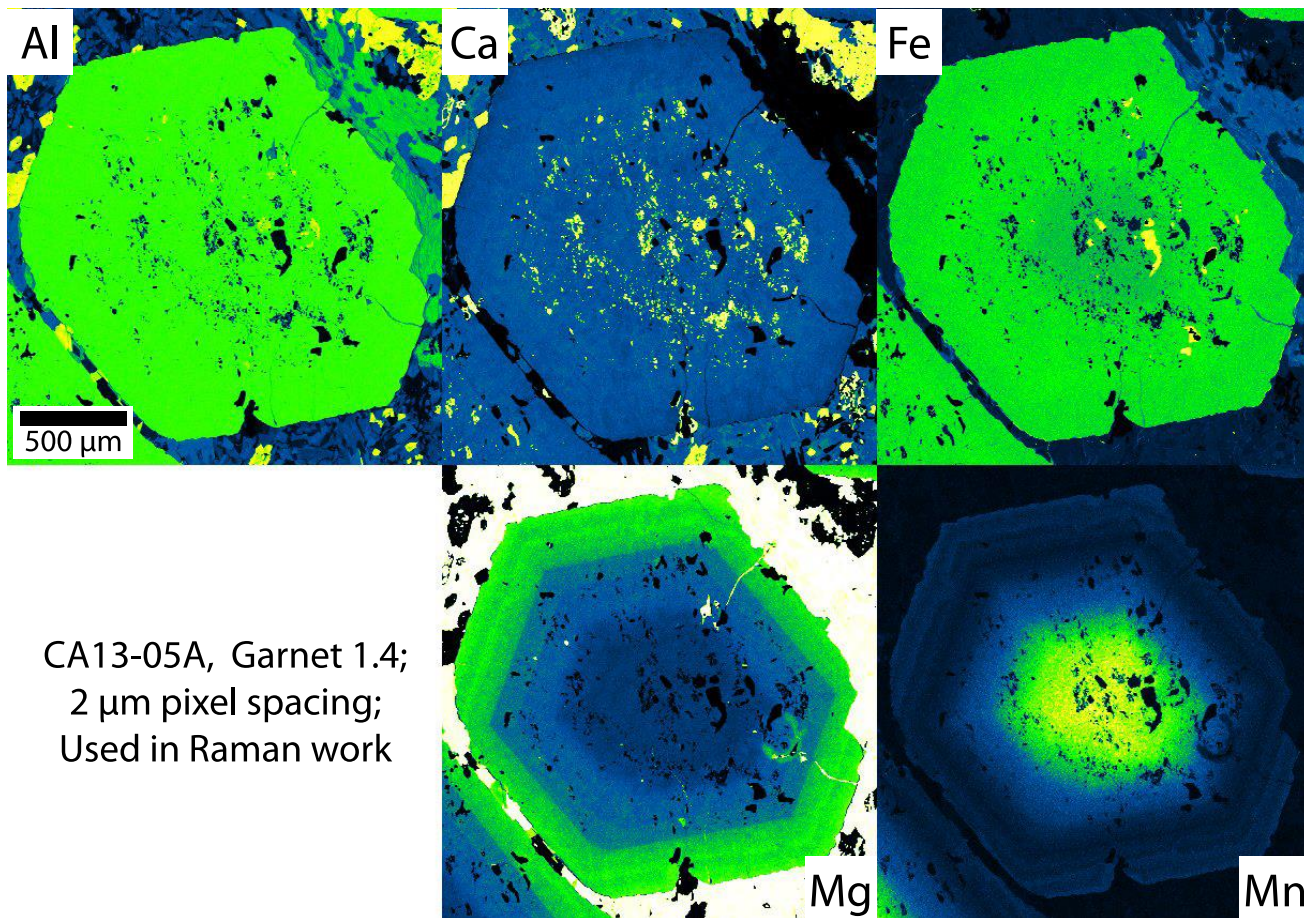
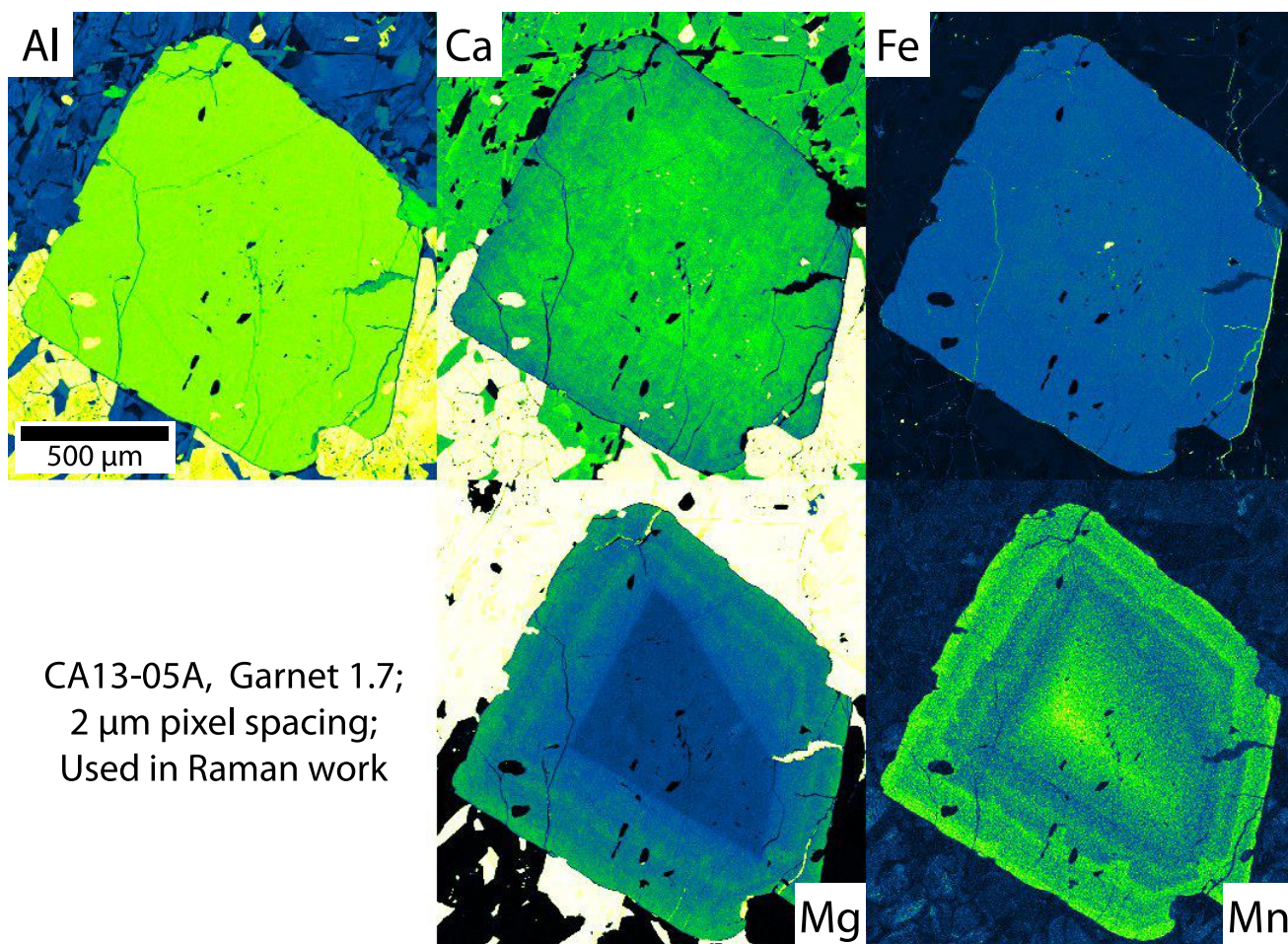


fig. S8. Color overlay x-ray count maps for major divalent elements in Garnet 1.2 from CA13-05A.



CA13-05A, Garnet 1.4;
2 μm pixel spacing;
Used in Raman work

fig. S9. Color overlay x-ray count maps for major divalent elements in Garnet 1.4 from CA13-05A.



CA13-05A, Garnet 1.7;
2 μm pixel spacing;
Used in Raman work

fig. S10. Color overlay x-ray count maps for major divalent elements in Garnet 1.7 from CA13-05A.

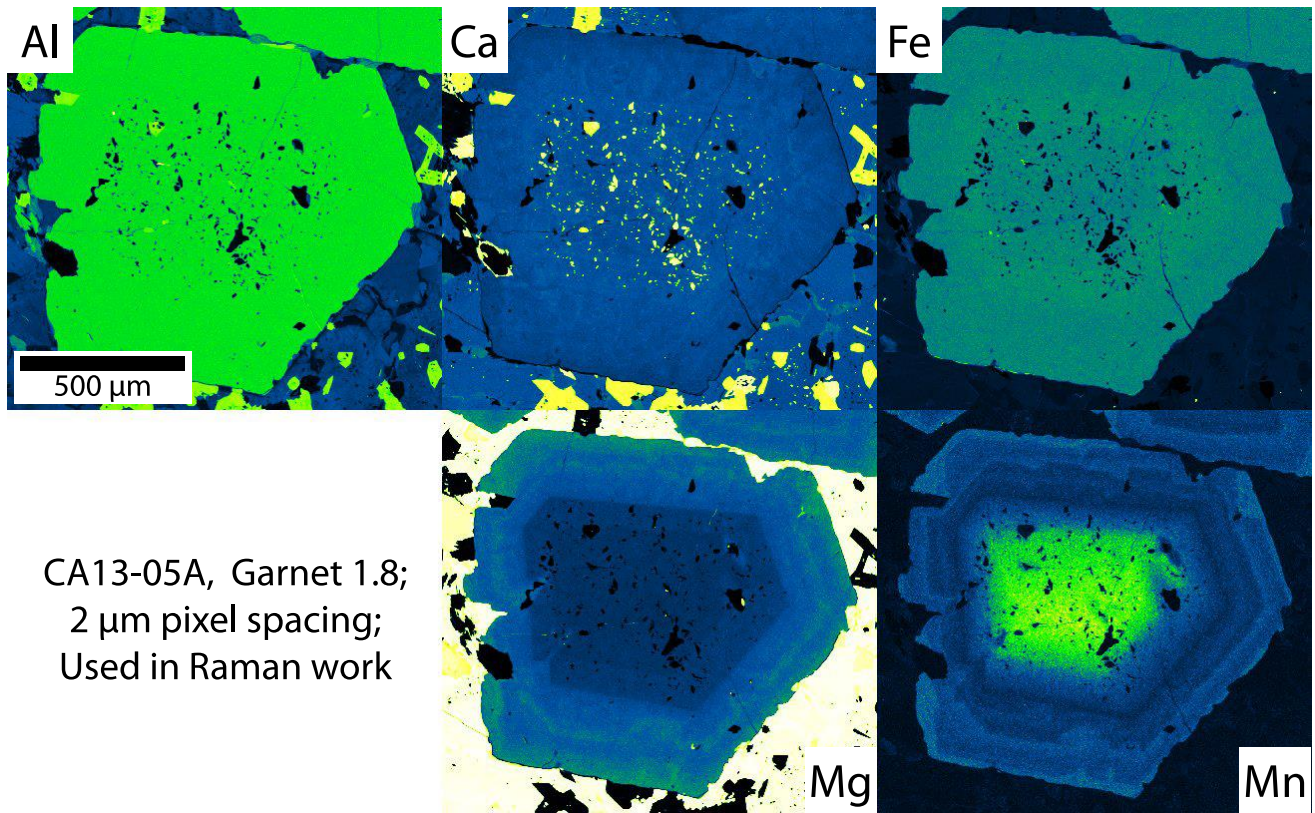


fig. S11. Color overlay x-ray count maps for major divalent elements in Garnet 1.8 from CA13-05A.

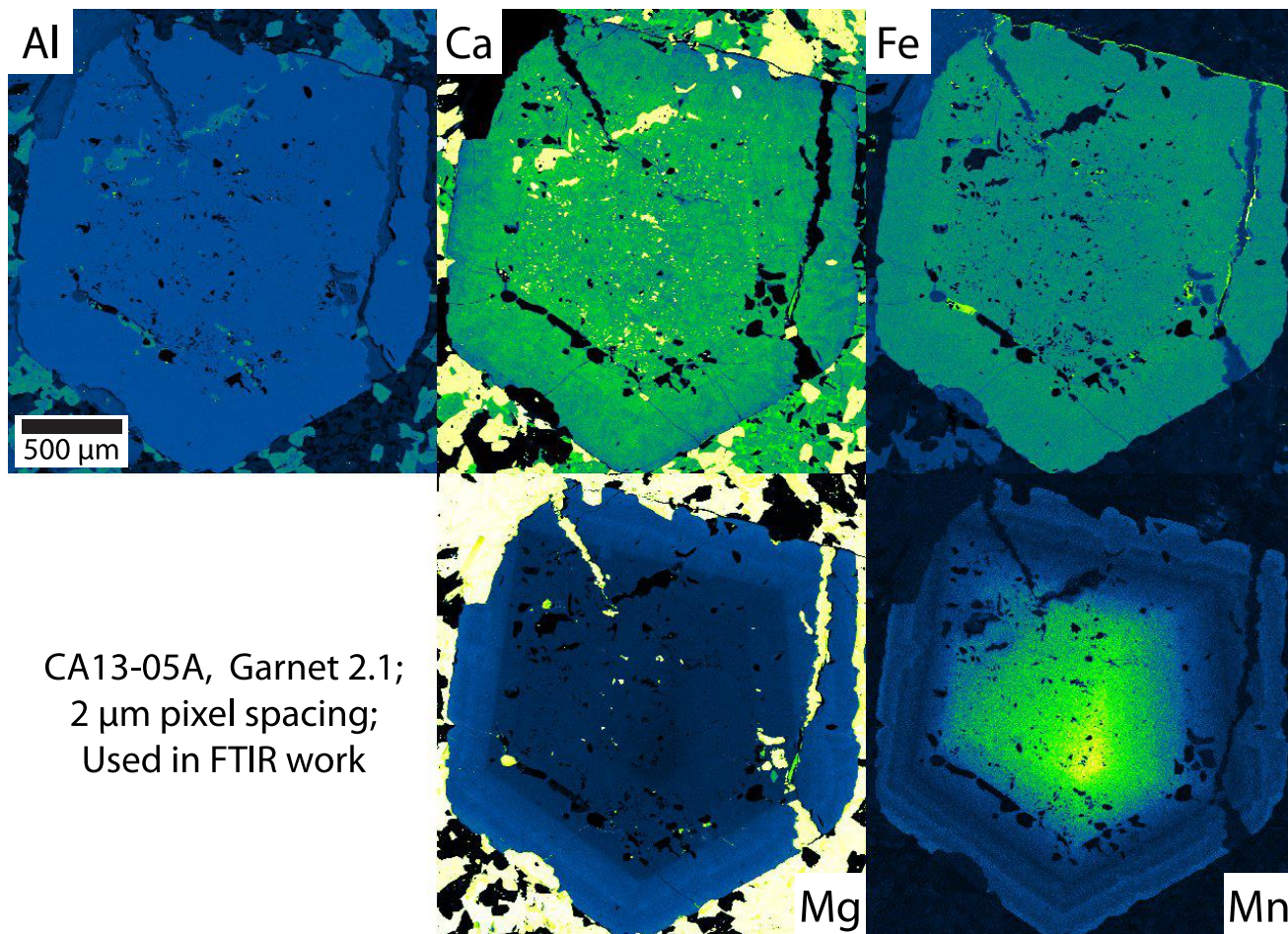


fig. S12. Color overlay x-ray count maps for major divalent elements in Garnet 2.1 from CA13-05A.

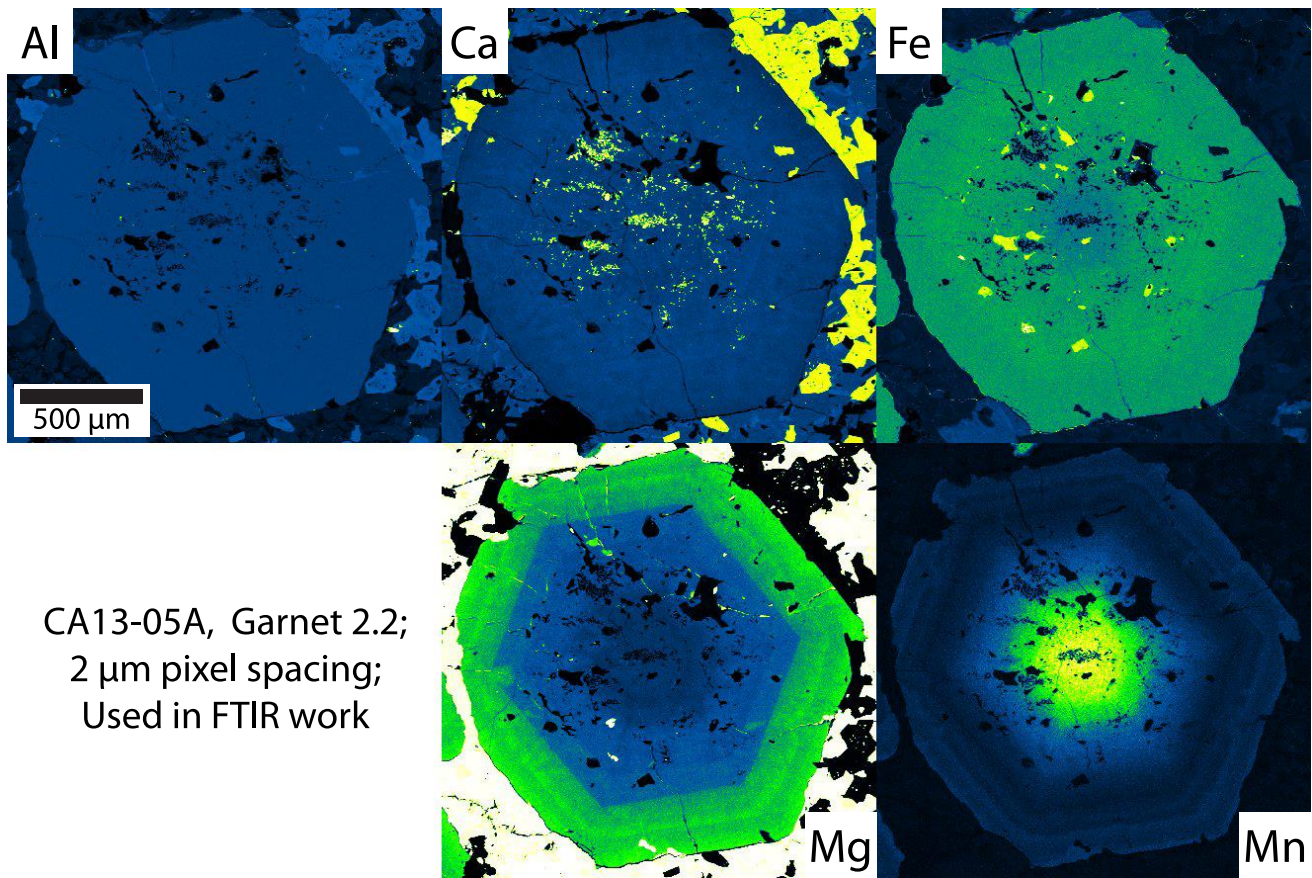


fig. S13. Color overlay x-ray count maps for major divalent elements in Garnet 2.2 from CA13-05A.

Color-enhanced wavelength-dispersive spectrometer x-ray count maps for Mg and Mn in garnets from Ring Mountain. Decreasing Mg/Mn content are indicated by yellow–green–blue–black color progression. Spots give location of Raman quartz analyses and are colored according to peak position ($\pm 1.5 \text{ cm}^{-1}$ about 470.9 cm^{-1} for CA13- 01; $\pm 1.5 \text{ cm}^{-1}$ about 470.2 cm^{-1} for CA13-05A; see data in manuscript Fig. 3d). Spot size indicated is much larger than actual $1 \mu\text{m}$ spot.

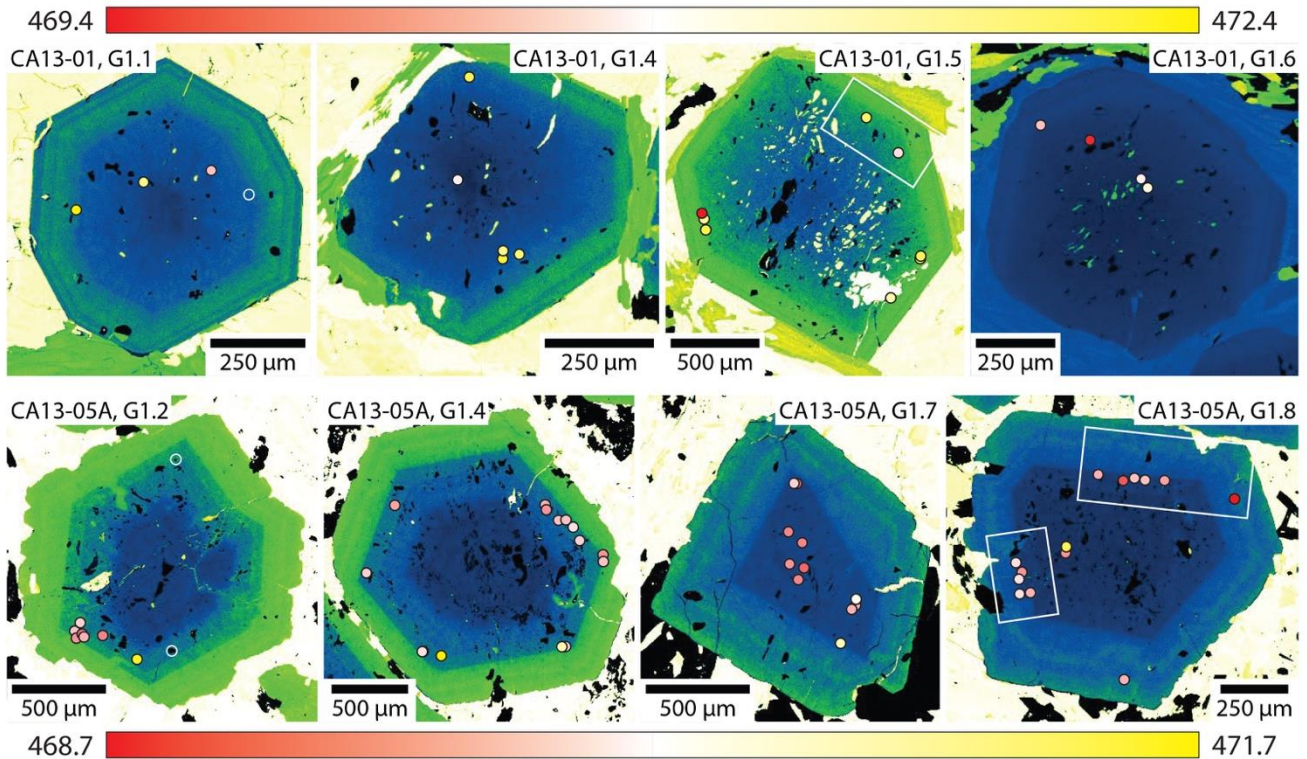


fig. S14. Color overlay x-ray count maps for Mg in garnets from CA13-01 and CA13-05A.

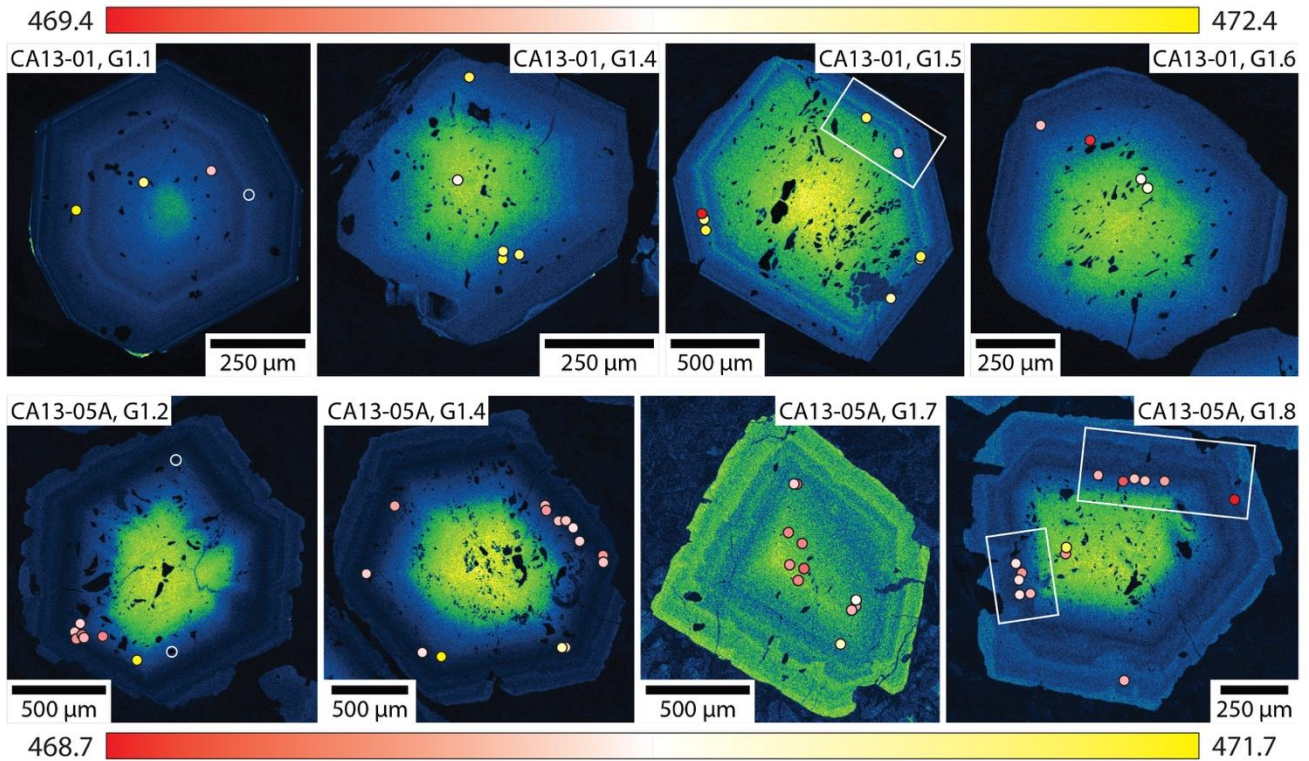


fig. S15. Color overlay x-ray count maps for Mn in garnets from CA13-01 and CA13-05A.

Blow-ups of white rectangles in the figures on the previous page, showing notable zones with varying Raman response linked to compositional zoning boundaries.

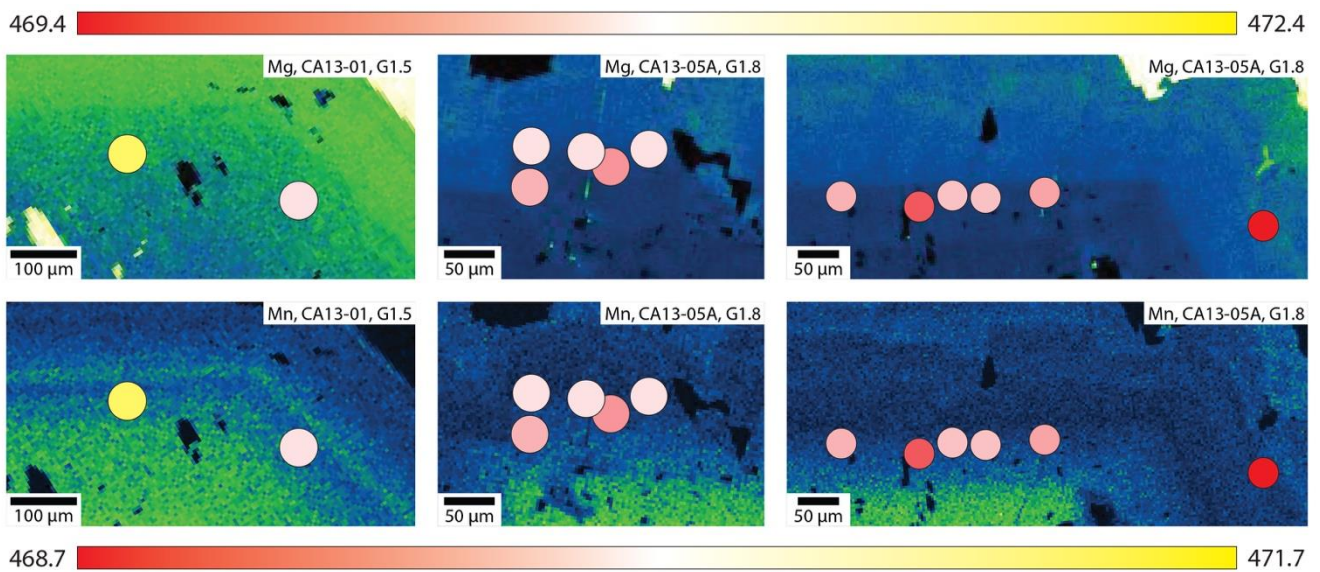


fig. S16. Blowups of regions indicated by white rectangles in (top row) fig. S14 and (bottom row) fig. S15.

Solution models that were used for the modeling Perple_X modeling of metamorphic phase equilibria are as follows...

Amphibole	(71, 72)
Biotite	(73, 74)
Chlorite	(75)
Clinopyroxene	(76, 77)
Feldspar	(78)
Fluid	(79)
Garnet	(74)
Ilmenite	(74)
Melt	(80, 81)
White mica	(82, 83)