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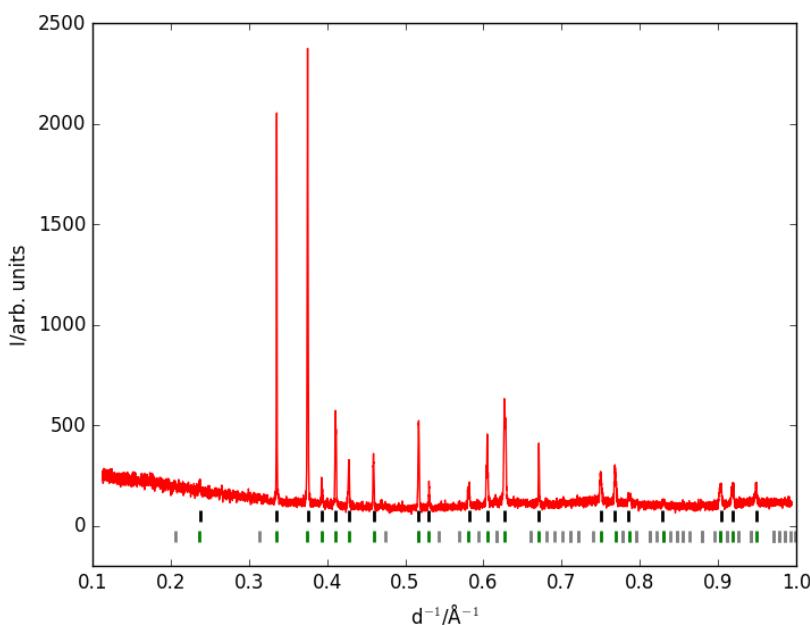
**Supporting information for article:**

**Accurate lattice-parameter determination from electron diffraction tomography data using two-dimensional diffraction vectors**

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### S1. Lattice parameters of the garnet sample

Four data sets in this paper are measured on a natural garnet sample with a composition close to that of andradite ( $\text{Ca}_3\text{Fe}_2(\text{SiO}_4)_3$ ) (Armbruster & Geiger, 1993) which has a cubic structure with space group  $Ia-3d$ . The lattice parameter of this sample was determined to be  $a = 11.926(2)$  Å from a powder X-ray diffractogram using  $\text{Cu } K_{\alpha 1}$  radiation, by least-squares refinement of expected peak positions against observed peak positions as from maximal intensity using the *NumPy* (Walt *et al.*, 2011) and *LMFIT* libraries (Newville *et al.*, 2014), see Figure S1.



**Figure S1** Powder X-ray diffractogram of the Garnet sample (red). Observed peak maxima positions are shown as black bars, expected peak positions used in the refinement as green bars and non-observed expected peaks as grey bars.

**Table S1** Lattice parameters determined using the clustering method in the RED data processing software (3D). Data sets collected on Gatan Orius 833, Gatan Erlangshen ES500W and Timepix are marked by \*, † and ‡, respectively. The data set marked by \$ indicated severe sample displacement during data collection.

Data set	<i>a</i> /Å	<i>b</i> /Å	<i>c</i> /Å	$\alpha$ /deg.	$\beta$ /deg.	$\gamma$ /deg.
Garnet‡	11.987	11.936	12.068	89.33	88.15	88.1
Garnet †	11.814	11.819	11.798	89.89	89.86	89.31
Garnet†\$	11.979	11.947	12.111	89.95	89.63	89.45
Garnet*	12.152	12.04	12.112	89.94	89.87	89.79
Ni <sub>3</sub> Se <sub>4</sub> O <sub>12</sub> Cl <sub>2</sub> †	9.433	9.459	8.16	105.04	91.72	101.53
Ni <sub>3</sub> Si <sub>2</sub> *	12.514	11.223	7.069	89.58	89.81	91.03
NiSeO <sub>3</sub> †	15.578	9.963	14.824	89.86	110.22	89.78
Silicate-1†	19.95	13.374	20.044	90.18	90.35	90.13
SSZ-45*	13.76	35.17	22.413	90.44	89.7	89.84
Bi.Subgal. ‡	8.514	4.738	24.036	90.26	90.75	89.99

**Table S2** Lattice parameters refined from 2D data using no displacement parameters (2D no disp). Data sets collected on Gatan Orius 833, Gatan Erlangshen ES500W and Timepix are marked by \*, † and ‡, respectively. The data set marked by \$ indicated severe sample displacement during data collection.

Data set	<i>a</i> /Å	<i>b</i> /Å	<i>c</i> /Å	$\alpha$ /deg.	$\beta$ /deg.	$\gamma$ /deg.
Garnet‡	12.03(1)	12.047(5)	12.049(7)	90.22(5)	89.80(6)	89.67(7)
Garnet †	11.855(3)	11.844(2)	11.829(4)	89.80(2)	89.99(3)	89.87(2)
Garnet†\$	12.33(1)	12.018(5)	12.064(4)	90.16(3)	88.08(5)	89.23(5)
Garnet*	12.096(2)	12.106(1)	12.1056(8)	89.978(7)	89.93(1)	90.14(1)
Ni <sub>3</sub> Se <sub>4</sub> O <sub>12</sub> Cl <sub>2</sub> †	9.443(4)	9.517(2)	8.180(3)	105.67(3)	91.85(4)	101.94(3)
Ni <sub>3</sub> Si <sub>2</sub> *	12.533(3)	11.100(4)	7.139(2)	90.06(3)	90.04(3)	89.98(3)
NiSeO <sub>3</sub> †	15.59(1)	9.949(4)	14.89(1)	89.78(5)	110.65(7)	89.95(5)
Silicate-1†	19.975(2)	13.404(2)	20.119(3)	89.90(1)	89.98(1)	90.14(1)
SSZ-45*	13.862(4)	35.62(1)	22.378(2)	90.28(1)	90.13(2)	89.83(3)
Bi.Subgal.‡	8.598(2)	4.675(3)	23.95(4)	90.03(8)	90.10(5)	89.58(4)

**Table S3** Lattice parameters refined from 2D data using no displacement parameters and no distortion correction (2D no disp no dist). Data sets collected on Gatan Orius 833, Gatan Erlangshen ES500W and Timepix are marked by \*, † and ‡, respectively. The data set marked by \$ indicated severe sample displacement during data collection.

Data set	$a$ /Å	$b$ /Å	$c$ /Å	$\alpha$ /deg.	$\beta$ /deg.	$\gamma$ /deg.
Garnet‡	12.08(1)	12.010(5)	12.003(7)	89.07(5)	89.08(7)	88.94(7)
Garnet †	11.821(3)	11.925(2)	11.866(4)	90.01(2)	89.21(3)	89.55(2)
Garnet†\$	12.43(1)	11.928(4)	12.155(4)	90.21(3)	88.05(5)	88.92(5)
Garnet*	12.217(2)	12.141(1)	12.0665(8)	91.180(8)	89.88(1)	90.10(1)
$\text{Ni}_3\text{Se}_4\text{O}_{12}\text{Cl}_2$ †	9.520(4)	9.485(2)	8.171(3)	104.82(3)	92.05(4)	101.89(3)
$\text{Ni}_3\text{Si}_2$ *	12.632(3)	11.266(4)	7.076(2)	90.13(3)	89.36(3)	90.09(3)
$\text{NiSeO}_3$ †	15.61(1)	10.022(4)	14.81(1)	89.68(5)	109.80(7)	90.12(5)
Silicate-1†	20.044(2)	13.359(2)	20.278(3)	90.05(1)	89.81(1)	89.33(1)
SSZ-45*	13.879(4)	35.65(1)	22.578(2)	89.81(2)	89.71(2)	91.04(3)
Bi.Subgal.‡	8.484(2)	4.740(3)	23.92(4)	90.22(8)	90.22(5)	89.97(4)