

**Single crystal growth, structural, magnetic, and magnetoelectric properties  
in spin-frustrated  $\alpha$ -Cu<sub>5</sub>O<sub>2</sub>(SeO<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub>**

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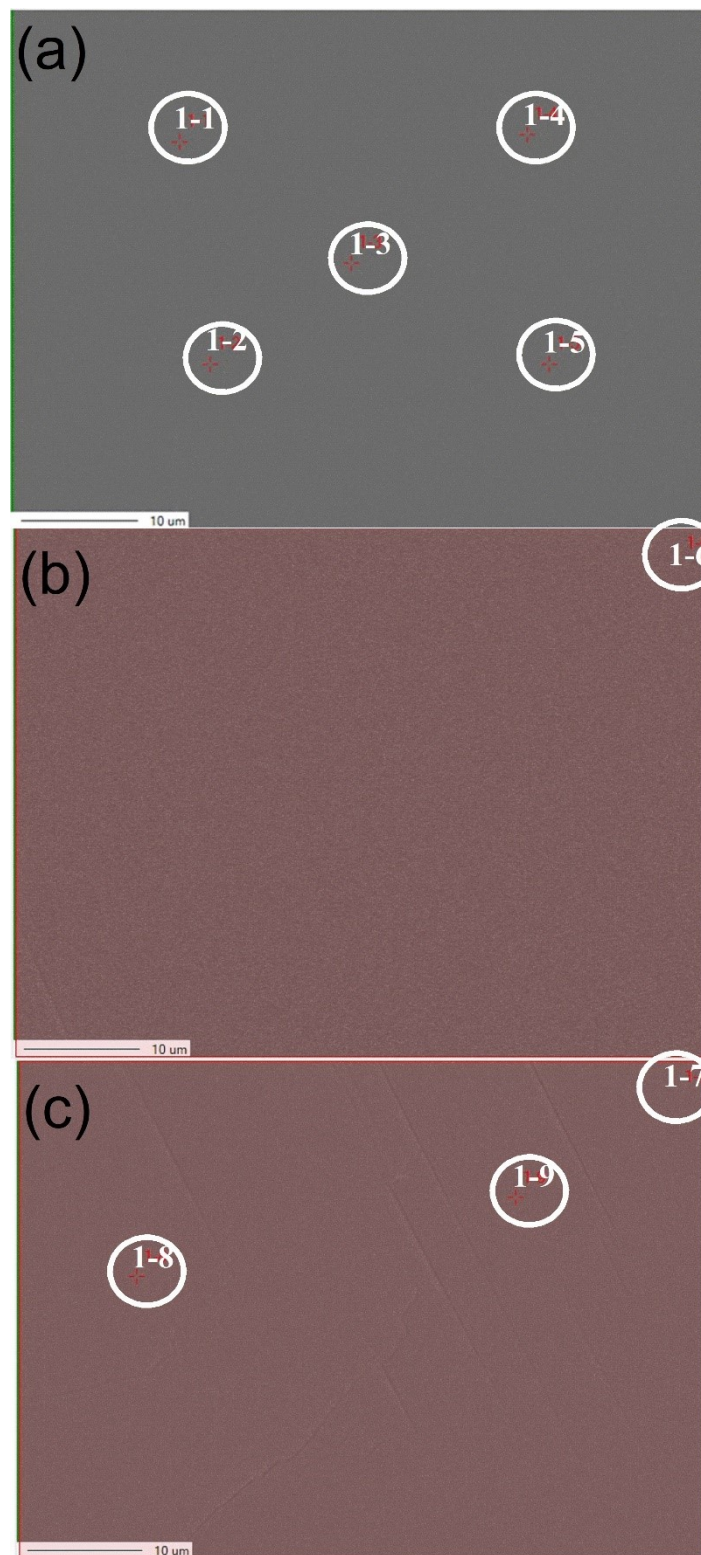


Fig. S1: EPMA images of  $\alpha\text{-Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$ ; for accuracy the data was collected on point scan on random places at three different single crystal of  $\alpha\text{-Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$ .

No.	Cu	Se	O	Cl	Total
1	32.0158	12.3293	43.0512	12.6037	100
2	30.054	12.8664	44.1063	12.9733	100
3	28.795	13.9637	45.8389	11.4024	100
4	27.9015	11.2761	50.2272	10.5952	100
5	28.9878	13.0166	46.9311	11.0645	100
6	31.6869	11.1032	44.7326	12.4773	100
7	29.7797	13.5504	44.7885	11.8814	100
8	27.0996	10.0905	48.2853	14.5246	100
9	28.2651	13.4384	43.63	14.6665	100
Minimum	27.0996	10.0905	43.0512	10.5952	100
Maximum	32.0158	13.9637	50.2272	14.666	100
Average	29.3983	12.4038	45.73234	12.4658	100

Table S1: Shows the  $\alpha$ -Cu<sub>5</sub>O<sub>2</sub>(SeO<sub>3</sub>)<sub>2</sub>Cl<sub>2</sub> EPMA quantitative elemental analysis; data was given in the atomic percentage.

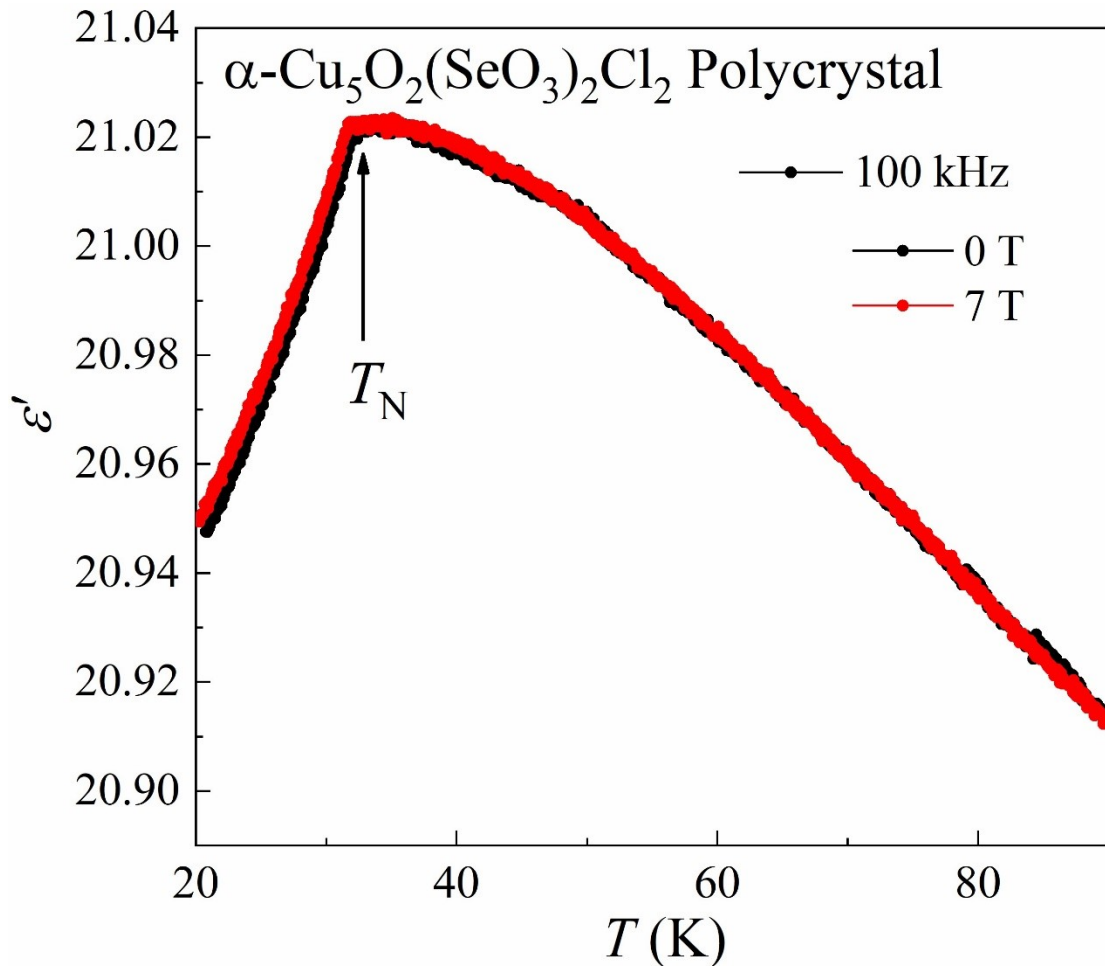


Fig. S2: Variation of temperature-dependent  $\epsilon'$  for  $\alpha\text{-Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$  polycrystalline sample for 0 and 7 T, respectively.

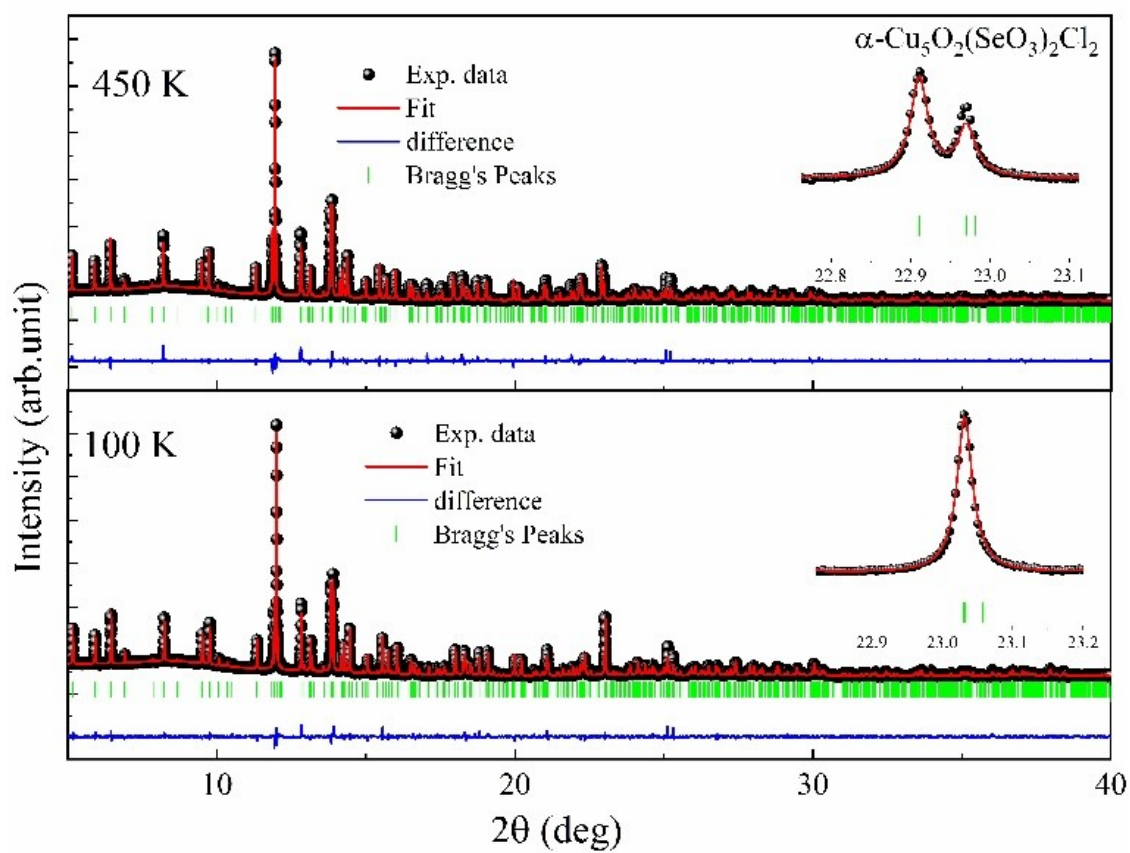


Fig. S3: (a) Rietveld refinement of  $\alpha\text{-Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$  at (a) 450 K and (b) 100 K, respectively

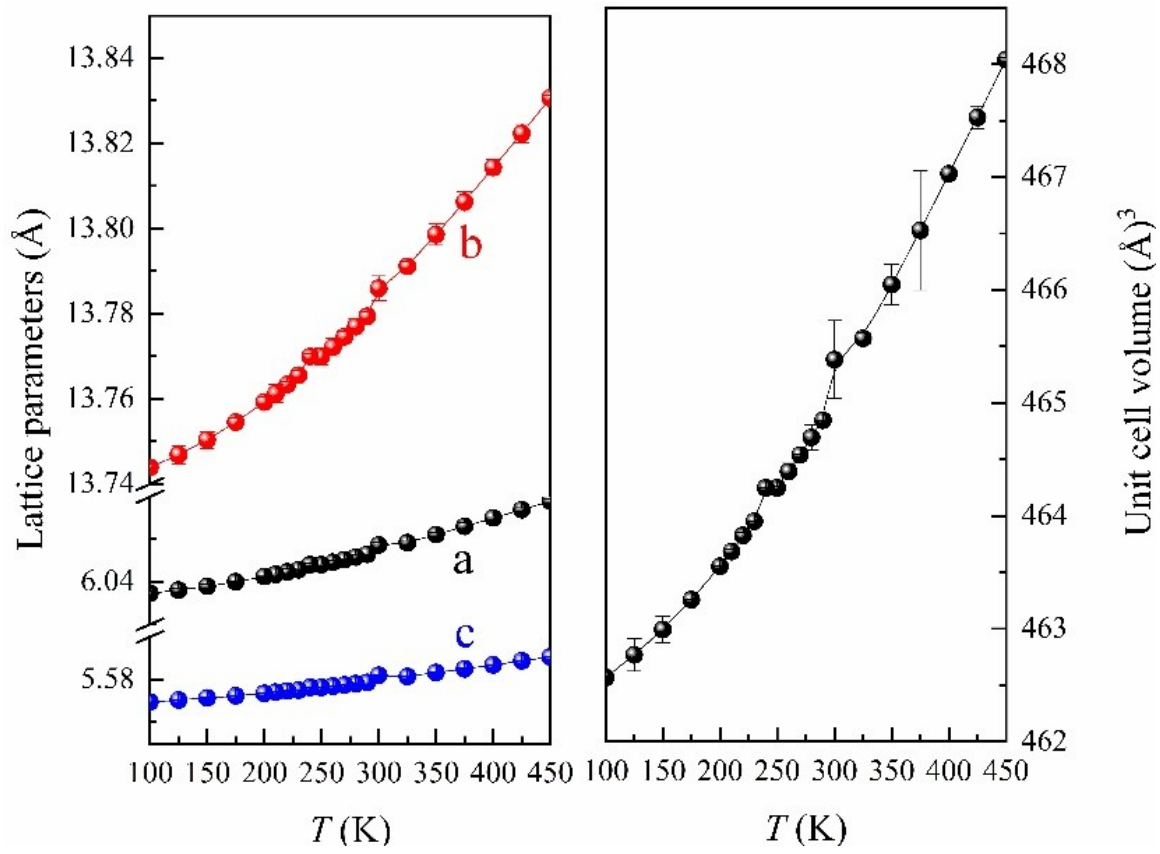


Fig. S4: Variation of the (a) lattice parameter (b) unit cell volume with respect to temperature for  $\alpha\text{-Cu}_5\text{O}_2(\text{SeO}_3)_2\text{Cl}_2$