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Supporting information for article:

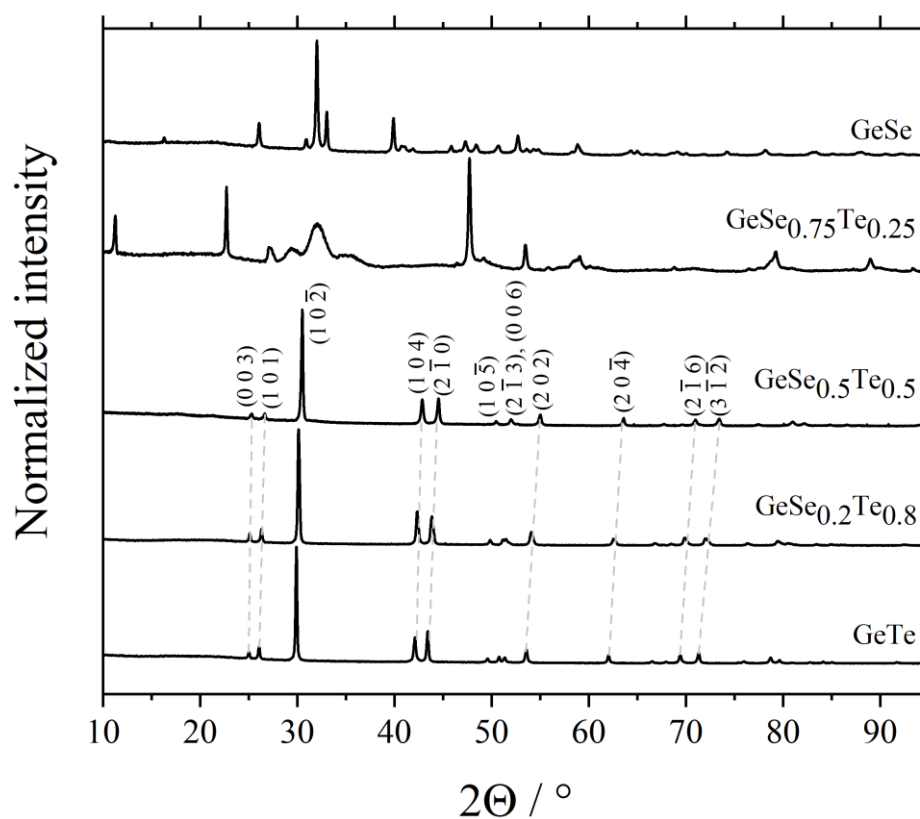
New insights on the GeSexTe_{1-x} phase diagram from theory and experiment

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S1. Indexed powder pattern

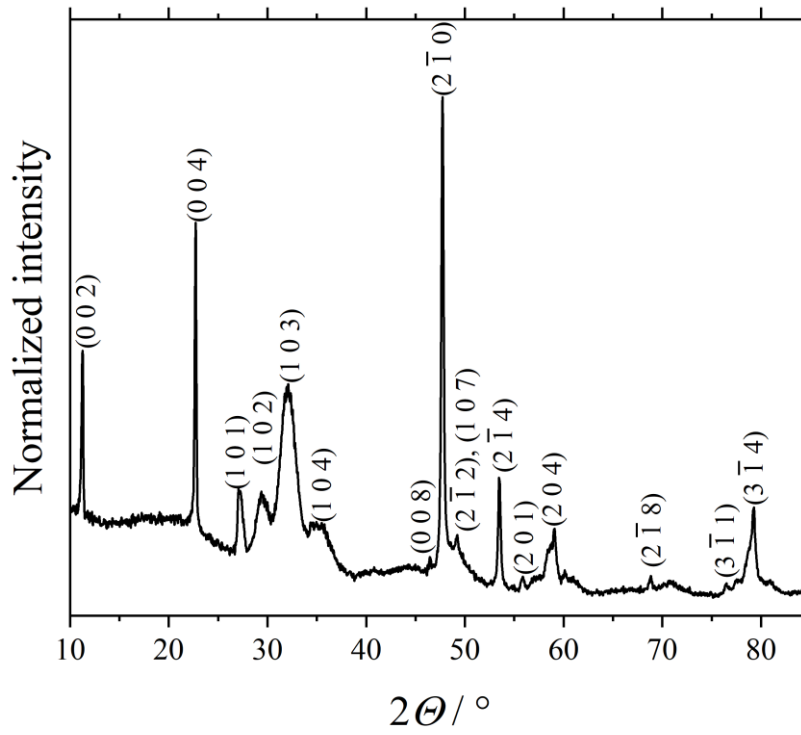
S1.1. $\text{GeSe}_x\text{Te}_{1-x}$

Indexed powder pattern of the isostructural $\text{GeSe}_x\text{Te}_{1-x}$ ($x = 0, 0.2, 0.5$) mixed crystals between $2\theta = 10-95^\circ$. All peaks are indexed with the lattice parameter reported by Bauer Pereira [17]. Miller indices of parts of the peaks are indicated. The compositional shift of these peak is marked by grey dashed lines. For comparison the powder pattern collected for $\text{Ge}_4\text{Se}_3\text{Te}$ and GeSe are also shown.



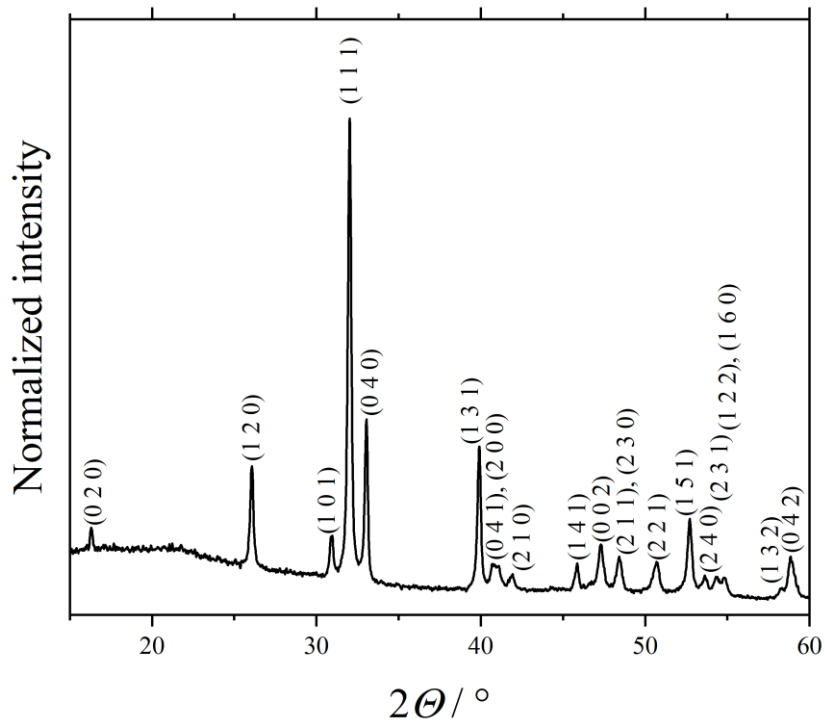
S1.2. Ge₄Se₃Te

Indexed powder pattern of Ge₄Se₃Te between $2\theta = 10-85^\circ$. All peaks are indexed with the lattice parameter reported by Küpers et al [13].



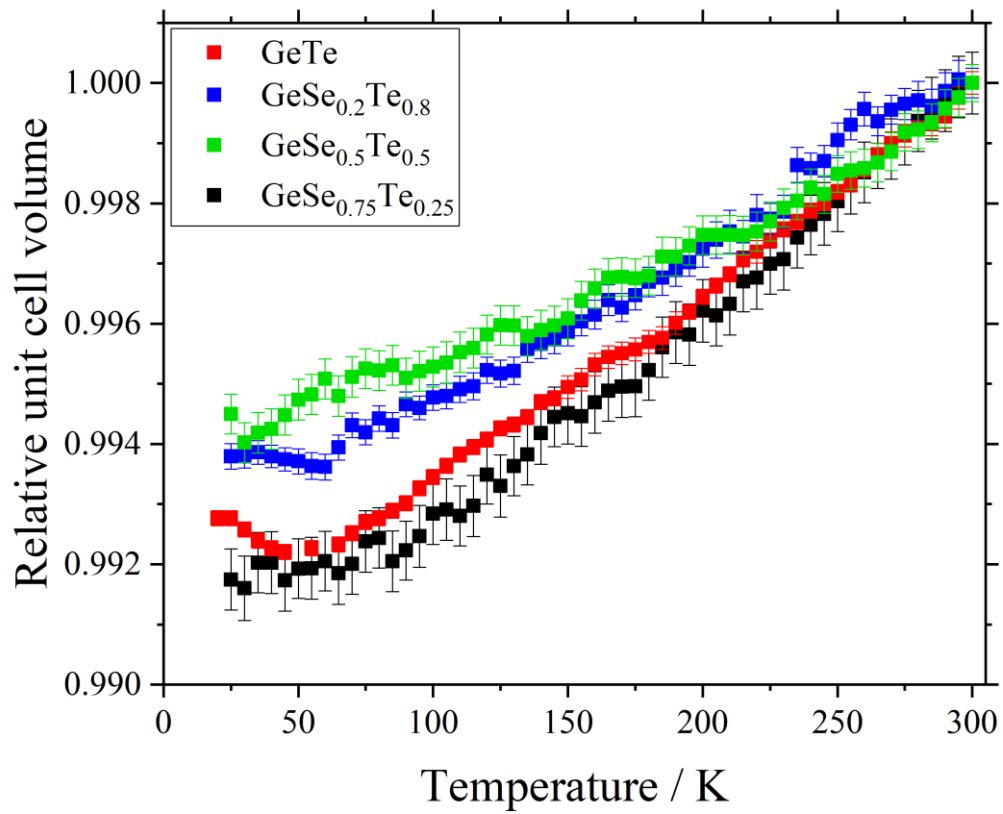
S1.3. GeSe

Indexed powder pattern of GeSe between $2\theta = 10-60^\circ$. All peaks are indexed with the lattice parameter reported by Wiedemeier et al [14].



S2. Temperature dependence of the unit the volumes

Temperature dependence of the normalized unit cell volumes of GeTe, GeSe_{0.2}Te_{0.8}, GeSe_{0.5}Te_{0.5} and Ge₄Se₃Te.



S3. Temperature dependence of the primitive lattice parameter

Lattice parameter of the corresponding primitive lattice of GeTe, GeSe_{0.2}Te_{0.8}, GeSe_{0.5}Te_{0.5} and Ge₄Se₃Te.

