Supporting Information

Raman Spectroscopy Study of Phonon Liquid Electron Crystal in Copper Deficient Superionic Thermoelectric Cu_{2-x}Te

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Table 1 shows the atomic percentage (at %) of Cu and Te for CT1.25, CT1.6 and CT2 obtained by EDS mapping. The atomic ratio of Cu w.r.t Te (Cu/Te) increases from CT1.25 to CT2 compounds.

Table 1. List of atomic percent (at %) of Cu and Te for CT1.25, CT1.6 and CT2 obtained from elemental mapping using EDS.

Sample	Chemical Formula	Atomic percent (at %)		Cu/Te
		Cu	Te	
CT1.25	$\text{Cu}_{1.25}\text{Te}$	52.59	47.41	1.11
CT1.6	$\text{Cu}_{1.6}\text{Te}$	62.59	31.41	1.99
CT2	Cu_2Te	68.45	31.55	2.17

Figure S 1. Room temperature Raman spectra of CT1.25, CT1.6 and CT2 on exposure with different laser power. (b) Optical image of the samples without laser burning and (c) with laser burning shown in red rectangle.

Cu_{2-x}Te compounds shows photo-sensibility and prone to degrade on exposure with high laser power. To achieve optimum condition for reliable Raman spectra, we have performed laser power dependent Raman study for CT1.25, CT1.6 and CT2 compounds using 100x long working distance objective as shown in Figure S1 (a). Optical image for the three compounds are shown in Figure S1(b) and (c). The samples showed stability from 35 μW to 2600 μW , however, above 1300 μW sample showed melting as shown in the red rectangle. On exposure with laser power above 1300 μW , the Raman spectra showed dominance of Tellurium due to melting and dissociation of the compounds.