

Supporting information

Engineering the energy gap near the valence band edge in Mn-incorporated $\text{Cu}_3\text{Ga}_5\text{Te}_9$ for an enhanced thermoelectric performance

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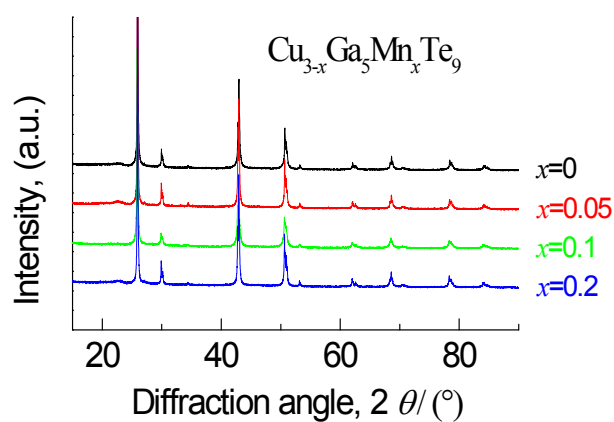


Fig.S1 X-ray diffraction patterns of $\text{Cu}_{3-x}\text{Ga}_5\text{Mn}_x\text{Te}_9$ powders.

Table S1 Chemical compositions (relative molars) identified for $x=0, 0.2$ in $\text{Cu}_{3-x}\text{Ga}_5\text{Mn}_x\text{Te}_9$ (taken from a mapping)

Compounds	Cu	Ga	Te	Mn
$\text{Cu}_3\text{Ga}_5\text{Te}_9$	3.02	4.95	9.0	----
$\text{Cu}_{2.8}\text{Ga}_5\text{Mn}_{0.2}\text{Te}_9$	2.78	4.96	9.0	0.13

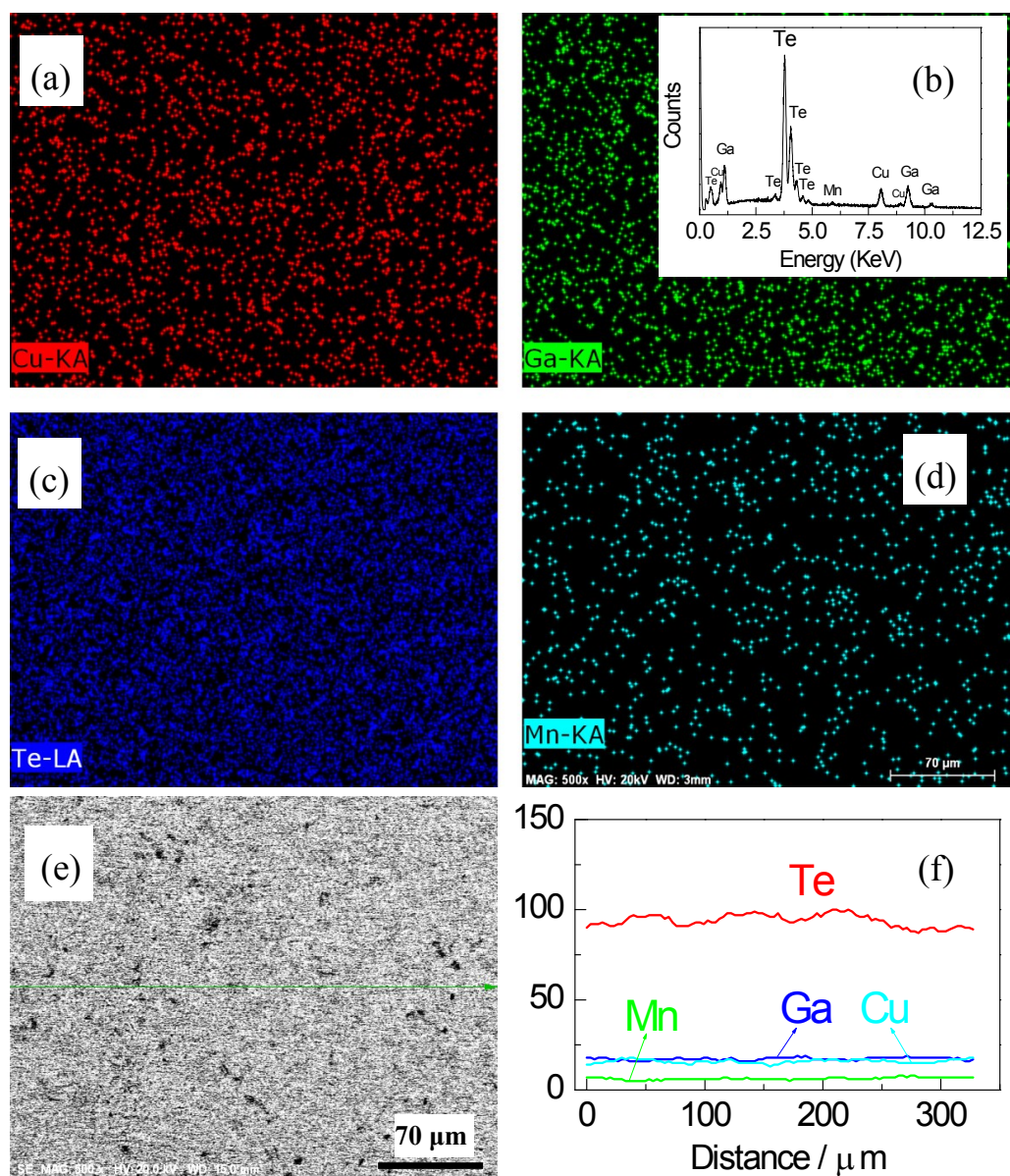


Fig.S2 EPMA mapping (a-d) of four elements and line scan (e, f) on the sample $\text{Cu}_{2.98}\text{Ga}_5\text{Mn}_{0.2}\text{Te}_9$, an insert in Fig.S2b is the Energy dispersive x-ray spectrum.

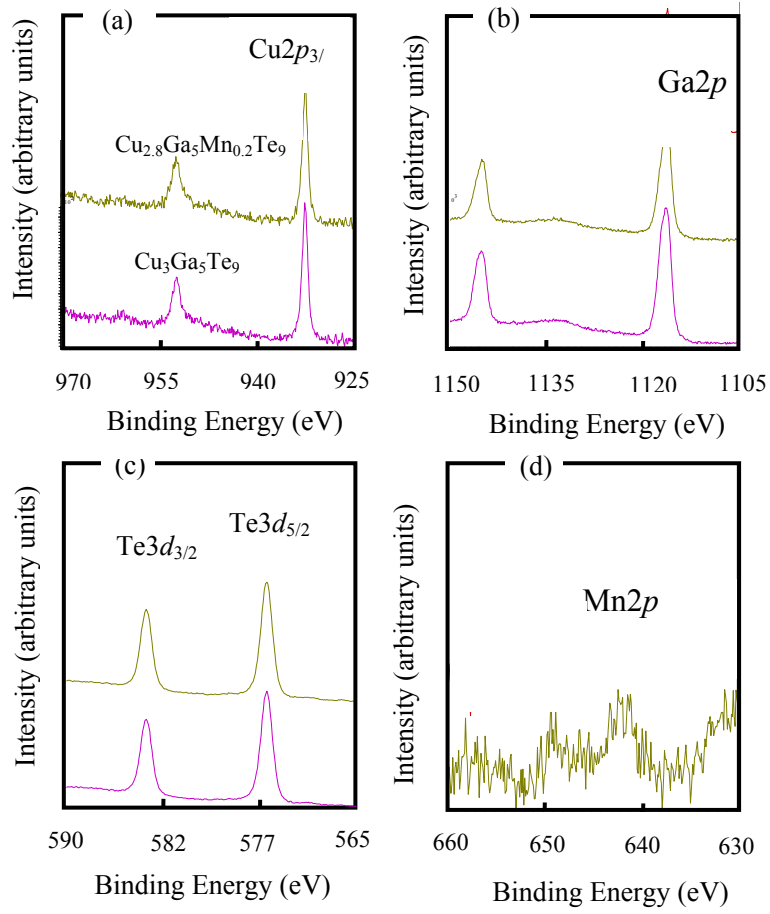


Fig. S3 XPS spectra of (a) Cu2p, (b) Ga2p, (c) Te3d, and (d) Mn2p for $\text{Cu}_{3-x}\text{Ga}_5\text{Mn}_x\text{Te}_9$.

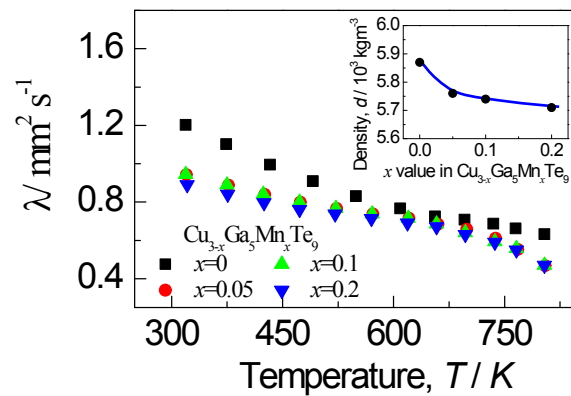


Fig.S4 Thermal diffusivities as a function of temperature for $\text{Cu}_{3-x}\text{Ga}_5\text{Mn}_x\text{Te}_9$, and the inset is the densities as a function of Mn content.

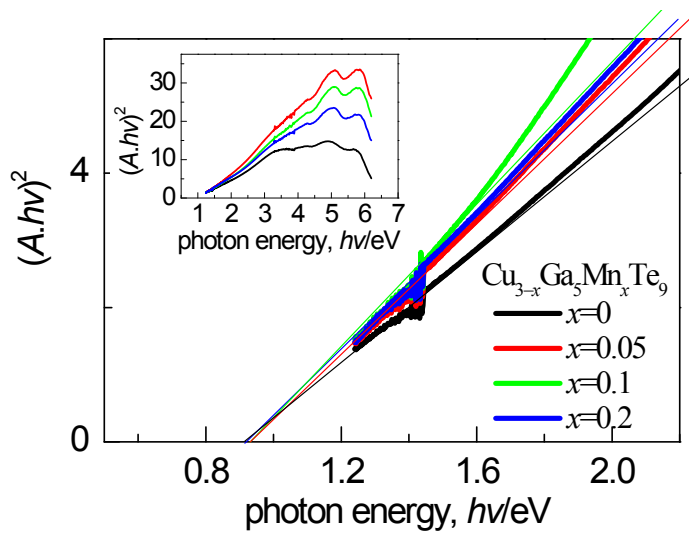


Fig.S5 Experimentally determined bandgap E_g of $Cu_{3-x}Ga_5Mn_xTe_9$. The upper left insert is the full relation of $(A \cdot hv)^2 = (hv - E_g)$, A is the absorption coefficient, $h\nu$ is the photon energy.