

Electronic Supplementary Information for

Vanadium-free colusites $\text{Cu}_{26}\text{A}_2\text{Sn}_6\text{S}_{32}$ ($\text{A} = \text{Nb}, \text{Ta}$) for environmentally-friendly thermoelectrics

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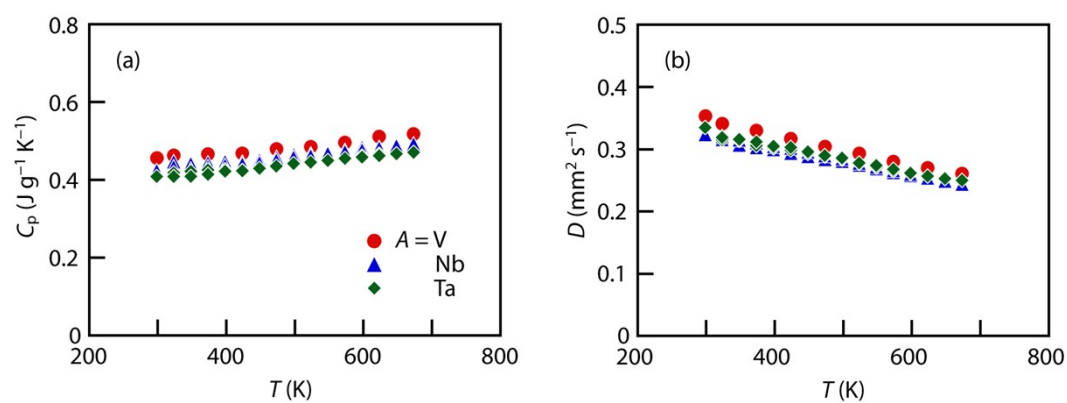


Figure S1

Temperature dependences of (a) heat capacity C_p , and (b) thermal diffusivity D for the sintered $\text{Cu}_{26}A_2\text{Sn}_6\text{S}_{32}$ ($A = \text{V}, \text{Nb}, \text{Ta}$) compacts.

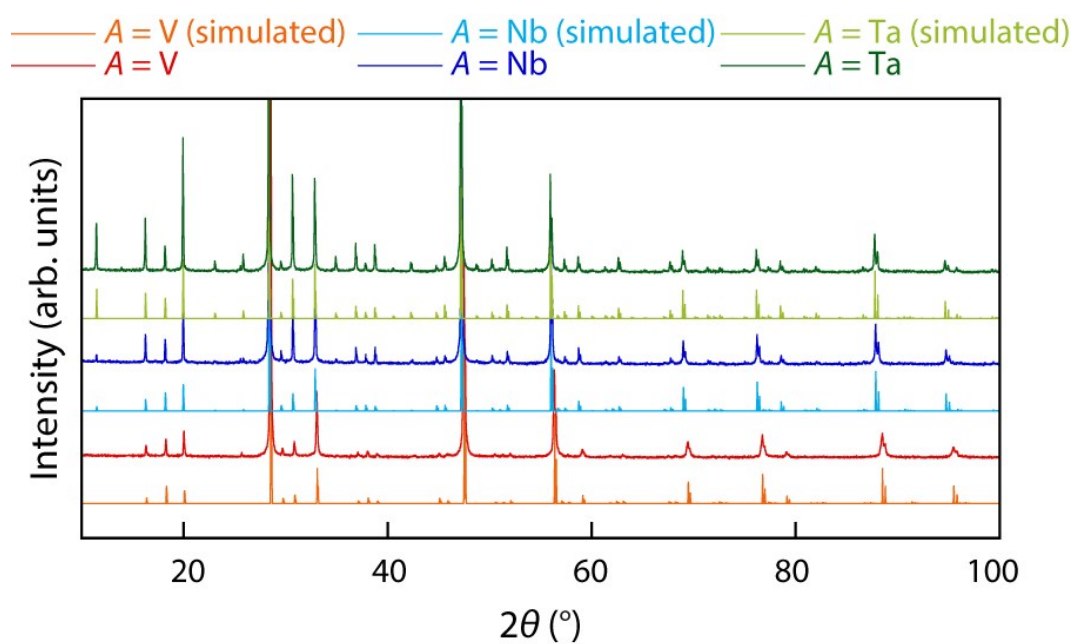


Figure S2

Powder X-ray diffraction (XRD) patterns for the sintered compacts of $\text{Cu}_{26}\text{A}_2\text{Sn}_6\text{S}_{32}$ ($\text{A} = \text{V}$, Nb , Ta) with simulated ones over the 2θ range of 10° to 100° . Simulated XRD patterns are shown below each measured patterns.

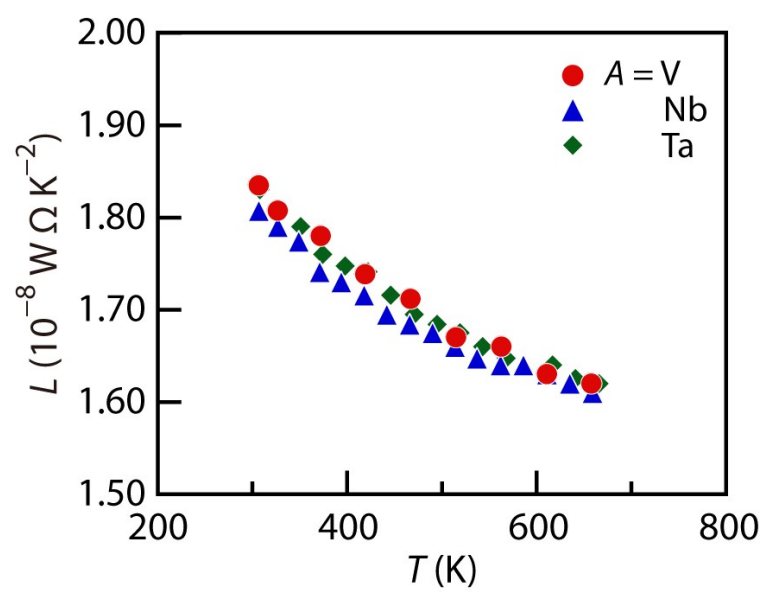


Figure S3

Temperature dependence in temperature of the estimated Lorentz number L for the sintered compacts of $\text{Cu}_{26}A_2\text{Sn}_6\text{S}_{32}$ ($A = \text{V}, \text{Nb}, \text{Ta}$).

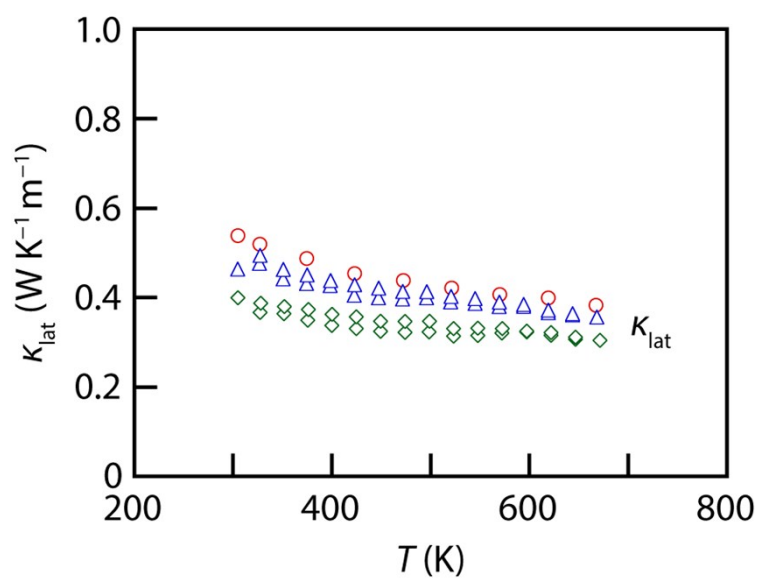


Figure S4

Lattice thermal conductivity (κ_{lat}) of the sintered compacts of $\text{Cu}_{26}\text{A}_2\text{Sn}_6\text{S}_{32}$ ($A = \text{V}, \text{Nb}, \text{Ta}$) using Sommerfeld Lorenz number ($2.44 \times 10^{-8} \text{ W } \Omega \text{ K}^{-2}$).

Table S1

Energy dispersive spectroscopy analysis of the secondary phases in the sintered sample of $\text{Cu}_{26}\text{Ta}_2\text{Sn}_6\text{S}_{32}$.

Secondary Phase	Element	Chemical Composition [at.%]
Grey	Cu	43.5
	Ta	6.7
	Sn	4.5
	S	45.3
Dark gray	Cu	67.2
	Ta	2.1
	Sn	0.0
	S	30.6