

Thermoelectricity: From Atoms to Systems

L5.3 Quiz

Answers

- 1) The material thermoelectric figure of merit is roughly proportional to ... (μ is the carrier mobility, m^* is the effective mass of carriers, and κ is the thermal conductivity)

a. $\frac{\mu}{\kappa}$

b. $\frac{\mu(m^*)^{1.5}}{\kappa}$

c. $\frac{\mu}{\kappa(m^*)^{1.5}}$

d. $\frac{\kappa}{\mu(m^*)^{1.5}}$

e. $\frac{(\mu)^{1.5} m^*}{\kappa}$

- 2) What is the definition of the Lorenz number L ? (κ_e is the electronic thermal conductivity, κ_l is the lattice thermal conductivity, σ is the electrical conductivity, and T is the absolute temperature.)

a. $L = \frac{\kappa_e + \kappa_l}{\sigma T}$

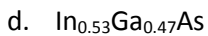
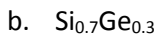
b. $L = \frac{\kappa_l}{\sigma T}$

c. $L = \frac{\kappa_e}{\sigma T}$

d. $L = \frac{\sigma T}{\kappa_e}$

e. $L = \frac{\sigma T}{\kappa_l}$

- 3) Which material is a better thermoelectric material among the followings at 600 K?



- 4) Which of the following bulk thermoelectric materials has the largest ZT (up to Oct. 2013)?
- a. LAST-18
 - b. SALT-20
 - c. Spark-plasma-sintered Na-doped PbTe:SrTe
 - d. TAGS
 - e. SiGe