Thermoelectricity: From Atoms to Systems

L5.4 Quiz

Answers

1) Which is NOT a typical characteristic of thermoelectric skutterudites?
   a. Complex crystal structure including voids
   b. Low thermal conductivity due to the phonon scattering by rattlers
   c. Good carrier mobilities
   d. Try to implement phonon glass – electron crystal idea
   e. $Ba_8Ga_{16}Ge_{30}$ is one example.

2) Which of the following materials is NOT related to the concept of phonon glass – electron crystal?
   a. Skutterudites
   b. Clathrates
   c. Kondo insulator
   d. All of the above
   e. None of the above

3) Which is NOT one of the potential causes of high figure of merit in sodium cobalt oxide thermoelectric material?
   a. Pudding-mold shaped band structure for large Seebeck coefficient
   b. Heavy rattler atoms for thermal conductivity reduction
   c. Geometric frustration in cobalt oxide layer
   d. Electrically conducting layers for high electrical conductivity
   e. Large Spin entropy by mixed states of ionization

4) Which of the following strategies does NOT cause a large power factor of a thermoelectric semiconductor material?
   a. Band convergence
   b. Resonant states to distort the density of states
   c. Light effective mass of carriers with large band degeneracy
   d. Kondo effect
   e. Semi metallic band structure