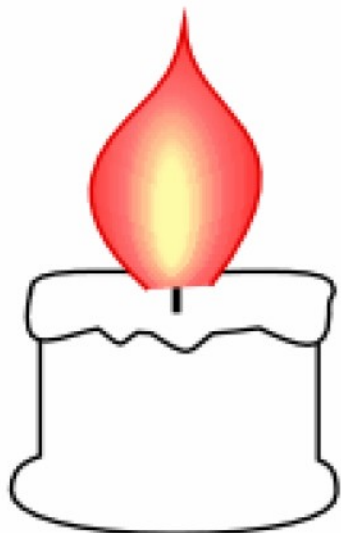
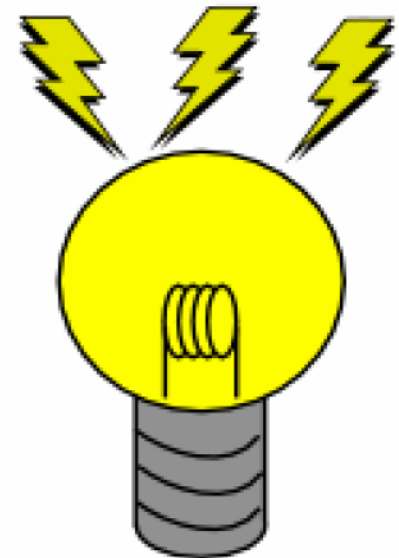
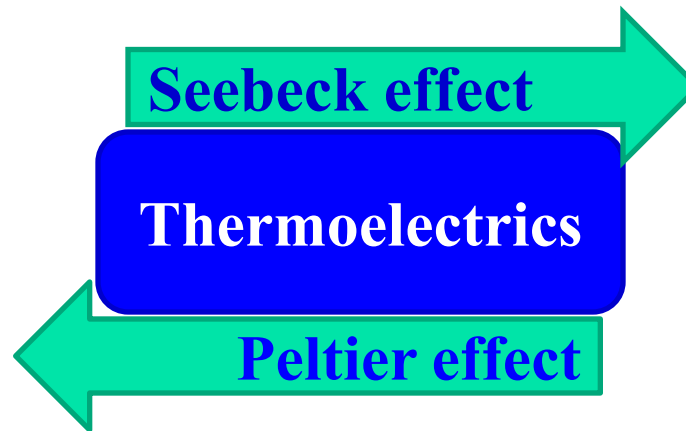


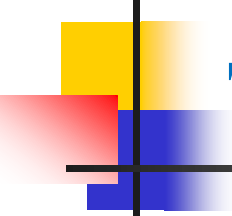
Thermoelectric conversion



**Heat
energy**



**Electrical
energy**



Thermoelectric properties

Figure of merit, Z [K^{-1}]

$$Z = \frac{\sigma S^2}{\kappa} = \frac{\sigma S^2}{\kappa_l + \kappa_e}$$

High performance:

$S \rightarrow \text{Large}$

$\rho \rightarrow \text{Low}$

$\kappa \rightarrow \text{Low}$

Dimensionless figure of merit, ZT

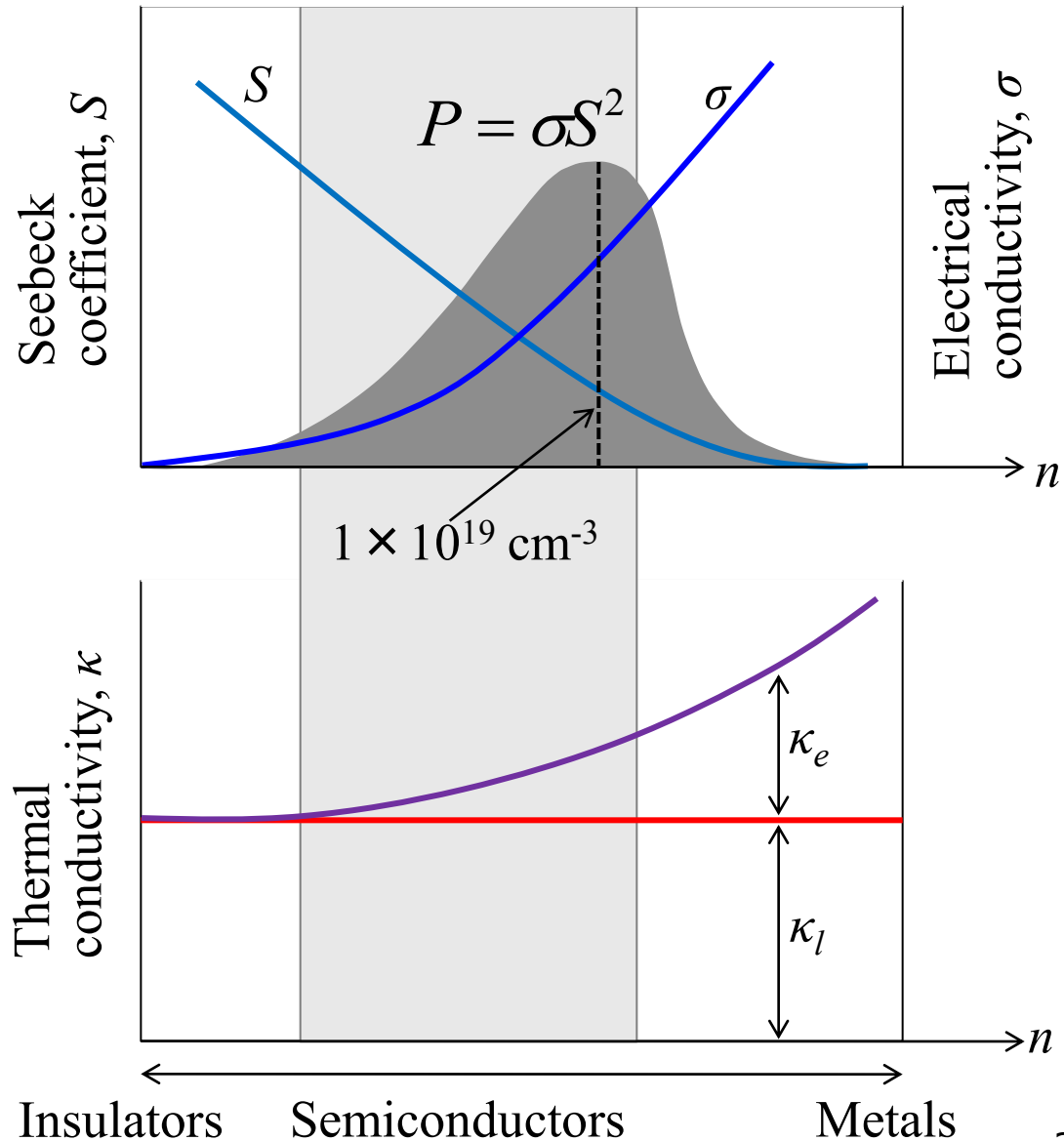
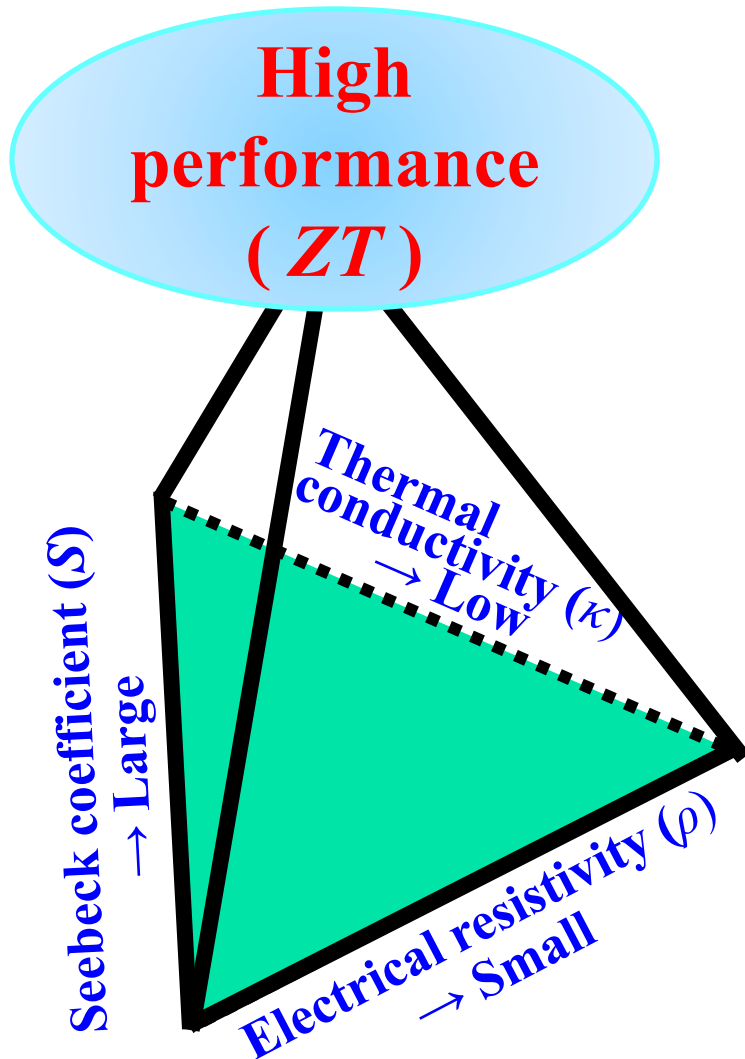
$$ZT = \frac{\sigma S^2 T}{\kappa} = \frac{\sigma S^2 T}{\kappa_l + \kappa_e}$$

Power factor, P [$\text{Wm}^{-1}\text{K}^{-2}$]

$$P = \sigma S^2 = \frac{S^2}{\rho}$$

S : Seebeck coefficient
 ρ : electrical resistivity
 κ : thermal conductivity
 κ_l : phonon (lattice) thermal conductivity
 κ_e : electronic thermal conductivity
 T : absolute temperature

Thermoelectric properties and carrier concentration



熱電材料高性能化へのアプローチおよび 当研究グループでの基本思考

