10.1 - The Band Theory of Solids

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- (2013) What is band theory?
- (2013) How does the band theory explain electrical properties of solids?
- (2013) In an intrinsic semiconductor, the energy gap $E_g = 1.2$ eV, and its hole mobility is very much smaller than electron mobility which is Independent of temperature. Assuming that the temperature dependence of intrinsic carrier concentration, n_i is expressed as:
  - $N_i = n_o \exp(-E_g/(K_B T))$, where n_o and K_B are constants, T is temperature and E_g is an energy equal to $E_q/2$.
  - What is the ratio between conductivity at 600 K and that at 300 K?
  - Comment on the result obtained above.
- (2017) How does the forbidden energy gap of an intrinsic semiconductor vary with increase in temperature?