Self-Assessment: Electronic Materials

Weekly Homework Quiz

1. Indium phosphide (InP) is a semiconductor with a band gap, E_g, of 1.27 eV. Calculate the value of the absorption edge of this material. Express your answer in meters.

2. Chemical analysis of a germanium (Ge) crystal reveals antimony (Sb) at a level of 0.0002 atomic percent.

    a. Assuming that the concentration of thermally excited charge carriers from the Ge matrix is negligible, calculate the density of free charge carriers (carriers/cm^3) in this Ge crystal.

    b. Draw a schematic energy band diagram for this material and label the valence band, conduction band, band gap, and the energy level associated with the Sb impurity.

3.091SC Introduction to Solid State Chemistry

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