

Chapter 37 Problem 28 †

Given

$$\lambda = 650 \text{ nm} = 6.50 \times 10^{-7} \text{ m}$$

Solution

Find the band gap for a GaAsP LED.

The energy of the photon is close to the energy of the band gap. Therefore, calculating the energy of the photon gives the band gap of this material.

$$E = \frac{hc}{\lambda} = \frac{(6.63 \times 10^{-34} \text{ J} \cdot \text{s})(3.00 \times 10^8 \text{ m/s})}{6.50 \times 10^{-7} \text{ m}} = 3.06 \times 10^{-19} \text{ J}$$

Convert this to electron volts gives

$$E = 1.91 \text{ eV}$$

†Problem from Essential University Physics, Wolfson