Given
band gap GaP = 2.26 *eV*

Solution

Find the wavelength emitted by a gallium phosphide LED (light emitting diode).

The energy of the band gap matches the energy of the photon as an electron drops from the conduction band into the valence band of the material. First convert the energy into joules.

$$E = 2.26 \ eV \frac{1.6 \times 10^{-19} \ J}{1 \ eV} = 3.62 \times 10^{-19} \ J$$

Now use the equation representing the energy of a photon and solve for wavelength.

$$E = \frac{hc}{\lambda}$$

$$\lambda = \frac{hc}{E} = \frac{(6.63 \times 10^{-34} \ J \cdot s)(3.00 \times 10^{8} \ m/s)}{3.62 \times 10^{-19} \ J} = 5.49 \times 10^{-7} \ m = 549 \ nm$$

This photon is in the green portion of the visible spectrum.

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†Problem from Essential University Physics, Wolfson