Answer on Question #73575, Physics / Atomic and Nuclear Physics

determine that the maximum wavelength of the photon required to break up a copper pair in tin is 1.08 x 10^{-3} m , calculate the energy gap.

Solution:

The Cooper pair binding energy, or energy gap, is E_g.

The energy is

$$E_g = h\nu = \frac{hc}{\lambda}$$

So,

$$E_g = \frac{6.63 \times 10^{-34} \times 3 \times 10^8}{1.08 \times 10^{-3}} = 1.84 \times 10^{-22}\, Joule =$$
$$= 1.84 \times 10^{-22} \times 6.24 \times 10^{18}\, eV = 1.15 \times 10^{-3}\, eV$$

Answer: $1.15 \times 10^{-3}\, eV$