Answer on Question #43163-Physics-Nuclear Physics

X-rays with an initial wavelength of 0.105 nm undergo Compton Scattering from aluminum target. Find the largest wavelength found in the scattered X-rays. (ANS: 0.110 nm)

Solution

For Compton Scattering we used formula

$$\lambda' - \lambda = \frac{h}{mc}(1 - \cos\phi) = \lambda_c(1 - \cos\phi).$$

Solve for λ':

$$\lambda' = \lambda + \lambda_c(1 - \cos\phi).$$

The largest λ' corresponds to $\phi = 180°$.

$$\lambda' = \lambda + 2\lambda_c = 0.105 \text{ nm} + 2 \cdot 2.42 \cdot 10^{-3} nm = 0.110 \text{ nm}.$$