Session #17: Homework Problems

Problem #1

You are operating an x-ray tube with a chromium (Cr) target by applying an acceleration potential (V) of 60 kV. Draw a schematic of the x-ray spectrum emitted by this tube; label on it three characteristic λs and give the numerical value of two of these.

Problem #2

(a) An X-ray tube with a silver (Ag) target at a plate voltage of 66 kV. Calculate the value of λ_{SWL}, the shortest wavelength.

(b) Sketch the emission spectrum (intensity vs. wavelength) of the Ag target in part (a). On your sketch, indicate the *relative* positions of the K_α, K_β, L_α, and L_β lines and λ_{SWL}. It is not necessary to calculate the λ values of the K_β, L_α, and L_β lines.

(c) In one or two sentences explain the origin of the continuous spectrum.

Problem #3

Determine the wavelength of λ_{K_α} for molybdenum (Mo).

Problem #4

Identify the element giving rise to K_α with $\lambda = 2.51 \times 10^{-10}$ m.

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