Answer on Question # 70159**, Chemistry / General Chemistry**

What is the velocity of the electron that is ejected from a metal surface (Φ = 1.714×10–19 J) when a 77 nm photon of light strikes the metal surface?

Solution:

1. Calculate the general energy:

$$K_{max} = h \times \frac{c}{\lambda} - \Phi_0$$

$$K_{max} = 6{,}63 \times 10^{-34} \times \frac{3 \times 10^8}{77 \times 10^{-9}} - 1.714 \times 10^{-19}$$

$$= 24.117 \times 10^{-19}\ (J)$$

2. Kinetic energy of the electron

$$K_{max} = \frac{1}{2} \times m \times v^2 \Longrightarrow v = \sqrt{\frac{2 \times K_{max}}{m}}$$

$$v = \sqrt{\frac{2 \times 24.117 \times 10^{-19}}{9.1 \times 10^{-31}}} = 2.30 \times 10^6\ (\frac{m}{s})$$

Answer: $2.30 \times 10^6\ (\frac{m}{s})$