电子科技大学
格拉斯哥学院
Glasgow College, UESTC

Score

Physical Experiment Ⅱ

Prelab Report 14

Experiment Title: The Photoelectric Effect

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Answers to Questions (20 points)

(1) No electrons are emitted if the incident light frequency falls below some cut-off frequency, also called the threshold frequency.

(2) The work function represents the minimum energy with which an electron is bound in the metal and if the electron is given the energy more than the work function, it could become the free electrons. And it is usually on the order of a few electron volts.

(3)

a. $E = h\frac{c}{\lambda}$

$$= 6.626\times10^{-34}\times\frac{3\times10^{8}}{300\times10^{-6}}$$

$$= 6.626\times10^{-19}J = 4.14125eV$$

b. $E_{kmax} = hv - w = 6.626\times10^{-34}\times3\times10\times10^{-4}J - 2.46eV = 1.68125eV$

c. $0 = E_{kmax} = hv\text{-}w$

$$hv_c = w$$

$$w = h\frac{c}{\lambda_c}$$

$$\lambda = \frac{hc}{w} = \frac{6.626\times10^{-34}\times3\times10^{8}}{2.46\times1.6\times10^{-19}} \approx 0.505\mu m$$