Matter And Radiation about Worksheet الملف
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UNIT 7 Dual Nature of Radiation and Matter

If a light of wavelength 330 nm is incident on a metal with work function 3.55 eV, the electrons are emitted. Then the wavelength of the emitted electron is (Take $h = 6.6 \times 10^{-34}\ Js$)

a. $< 2.75 \times 10^{-9}\ m$ b. $\geq 2.75 \times 10^{-9}\ m$

c. $\leq 2.75 \times 10^{-12}\ m$ d. $< 2.5 \times 10^{-10}\ m$

A photoelectric surface is illuminated successively by monochromatic light of wavelength λ and $\lambda/2$. If the maximum kinetic energy of the emitted photoelectrons in the second case is 3 times that in the first case, the work function at the surface of material is

(NEET 2015)

a) $\frac{hc}{\lambda}$ b) $\frac{2hc}{\lambda}$

c) $\frac{hc}{3\lambda}$ d) $\frac{hc}{2\lambda}$

In photoelectric emission, a radiation whose frequency is 4 times threshold frequency of a certain metal is incident on the metal. Then the maximum possible velocity of the emitted electron will be

a) $\sqrt{\frac{h\nu_0}{m}}$ b) $\sqrt{\frac{6h\nu_0}{m}}$

c) $2\sqrt{\frac{h\nu_0}{m}}$ d) $\sqrt{\frac{h\nu_0}{2m}}$

Two radiations with photon energies 0.9 eV and 3.3 eV respectively are falling on a metallic surface successively. If the work function of the metal is 0.6 eV, then the ratio of maximum speeds of emitted electrons will be

a) 1:4 b) 1:3

c) 1:1 d)1:9

A light source of wavelength 520 nm emits 1.04×10^{15} photons per second while the second source of 460 nm produces 1.38×10^{15} photons per second. Then the ratio of power of second source to that of first source is

a) 1.00 b) 1.02
c) 1.5 d) 0.98

The mean wavelength of light from sun is taken to be 550 nm and its mean power is $3.8 \times 10^{26} W$. The number of photons received by the human eye per second on the average from sunlight is of the order of

a) 10^{45} b) 10^{42}
c) 10^{54} d) 10^{51}

The threshold wavelength for a metal surface whose photoelectric work function is 3.313 eV is

a) 4125 $\mathring{A}$ b) 3750 $\mathring{A}$
c) 6000 $\mathring{A}$ d) 2062.5 $\mathring{A}$

A light of wavelength 500 nm is incident on a sensitive plate of photoelectric work function 1.235 eV. The kinetic energy of the photo electrons emitted is be (Take $h = 6.6 \times 10^{-34} Js$)

a) 0.58 eV b) 2.48 eV
c) 1.24 eV d) 1.16 eV

Photons of wavelength λ are incident on a metal. The most energetic electrons ejected from the metal are bent into a circular arc of radius R by a perpendicular magnetic field having magnitude B. The work function of the metal is (KVPY-SX 2016)

a. $\frac{hc}{\lambda} - m_e + \frac{e^2B^2R^2}{2m_e}$

b. $\frac{hc}{\lambda} + 2m_e\left[\frac{eBR}{2m_e}\right]^2$

c. $\frac{hc}{\lambda} - m_ec^2 - \frac{e^2B^2R^2}{2m_e}$

d. $\frac{hc}{\lambda} - 2m_e\left[\frac{eBR}{2m_e}\right]^2$

The wavelength λ_e of an electron and λ_p of a photon of same energy E are related by (NEET 2013)

a. $\lambda_p \propto \lambda_e$

b. $\lambda_p \propto \sqrt{\lambda_e}$

c. $\lambda_p \propto \frac{1}{\sqrt{\lambda_e}}$

d. $\lambda_p \propto \lambda_e^2$

In an electron microscope, the electrons are accelerated by a voltage of 14 kV. If the voltage is changed to 224 kV, then the de Broglie wavelength associated with the electrons would

a. increase by 2 times

b. decrease by 2 times

c. decrease by 4 times

d. increase by 4 times

A particle of mass $3 \times 10^{-6} g$ has the same wavelength as an electron moving with a velocity $6 \times 10^{6} m\ s^{-1}$. The velocity of the particle is

a. $1.82 \times 10^{-18} m\ s^{-1}$

b. $9 \times 10^{-2} m\ s^{-1}$

c. $3 \times 10^{-31} m\ s^{-1}$

d. $1.82 \times 10^{-15} m\ s^{-1}$

When a metallic surface is illuminated with radiation of wavelength λ, the stopping potential is V. If the same surface is illuminated with radiation of wavelength 2λ, the stopping potential is $\frac{V}{4}$. The threshold wavelength for the metallic surface is (NEET 2016)

a. 4λ

b. 5λ

c. $\frac{5}{2}\lambda$

d. 3λ

The work functions for metals A, B and C are 1.92 eV, 2.0 eV and 5.0 eV respectively. The metals which will emit photoelectrons for a radiation of wavelength 4100$\mathring{A}$ is/are

a. A only

b. both A and B

c. all these metals

d. none

Emission of electrons by the absorption of heat energy is called.....emission.

a. photoelectric

b. field

c. thermionic

d. secondary