Contents

Milikan's experiment for the verification of Einstein's photoelectric equation

Objective : *Describe Millikan's experiment for the verification of Einstein's photoelectric equation and calculate Planck's constant.*

Experimental Setup

Physical Structural setup in milikan's photoelectric experiment

- A circular disc is present.
- A light hole is present.
- A knife is present.

Function of knife in milikan's photoelectric experiment

- Knife removes the layer of surface from metal.

Cause of removal of layer of surface form metal by a knife in milikan's photoelectric experiment

- The layer of surface from metal is removed to freshen the surface.
- The previous photon struck in the surface knock off the electrons.

- The later photon struck in the surface cannot knock off electrons in more amount in the unremoved surface.

Physical Material setup in milikan's photoelectric experiment

- There is the presence of metals.
- The metals are present around a circle.

Chemistry of metals in milikan's photoelectric experiment.

- The metals in milikan's photoelectric experiment are
  - alkali

Number of metals in milikan's photo electric experiment.

- The number of metals in milikan's photo electric experiment is
  - 3

Electrical setup in milikan's photoelectric experiment

- A cathode is present.
- A galvanometer is present.
- A key is present.
- A source is present.

Charge in cathode in milikan's photoelectric experiment

- The charge of cathode in milikan's photoelectric experiment is
  - negative

Cause of negative charge in cathode in photoelectric experiment

The negative charge of cathode in photoelectric experiment

- Only allows to move fast moving electron inside the cathode.

Atmospheric setup in milikan's photoelectric experiment

- The atmospheric setup in milikan's photoelectric experiment is
  - Vacuum

Optical setup in milikan's photoelectric experiment

- A light filter is present.

Function of light filter in milikan's photoelectric experiment

- The light filter in milikan's photoelectric experiment generates monochromatic light.

Derivation for expression of einstein's photo electric equation in terms of y = mx + c

- $$hf = \phi + eV_0$$
- $$V_0 = \frac{hf}{e} - \frac{\phi_0}{e}$$
- $$V_0 = \frac{h}{e}f + (-\frac{\phi}{e})$$

Expression of einstein's photo electric equation in terms of y = mx + c

$$V_0 = \frac{h}{e}f + (-\frac{\phi_0}{e})$$

Expression of slope in einstein's photo electric equation in terms of y = mx + c

$$\text{Slope} = m = \frac{h}{e}$$

Expression of constant in einstein's photo electric equation in terms of y = mx + c

$$\text{Constant} = C = -\frac{\phi}{e}$$

Derivation for expression of planck's constant in terms of slope in einstein's photo electric equation

- $$\frac{h}{e} = \frac{\text{Rise}}{\text{Run}}$$
- $$h = \frac{\text{Rise}}{\text{Run}}e$$

Expression of planck's constant in terms of slope in einstein's photo electric equation

- $$h = \frac{\text{Rise}}{\text{Run}}e$$