**NAME:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Photoelectric Effect Lab**

**Physics 205**

**Prof. Singal**

*In class together we will measure the minimum electric potential (voltage) necessary to stop a current from flowing that would result from photons of light knocking electrons off of a material.*

We have that the kinetic energy of an outgoing electron is the incoming energy of the photons, which they gave to the electrons, minus the energy that had to go into breaking the bonds of the electrons to the metal structure. The latter is the so-called “work function”

If the movement of the electrons can be opposed with a potential energy equal to this kinetic energy then no current will flow. The potential energy of an electron in an electric potential is and . The energy that just stops the electrons is thus the energy of

.

Fill in the table with the wavelengths of light that we use and the stopping potential that we measure:

|  |  |  |  |
| --- | --- | --- | --- |
| Wavelength (nm) | Stopping Potential (V) | Frequency (Hz) | Stopping Energy (J) |
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1. Convert the wavelengths to frequencies (in Hz) and enter the values into the table. Recall that (and get the units correct).

2. Convert the stopping potentials to energies and enter the values into the table. The charge of an electron is 1.6x10-19 C.

3. Using Excel (or other plotting and fitting software if you prefer), plot the stopping energy, aka the energy of , versus the frequency. Since is a constant, the best-fit slope of this line is the constant of proportionality between and frequency, or in other words the constant *h* in .

4. What value do you determine for Planck’s constant, *h*? The accepted value is 6.63x10-34 J-s.