

AP Chemistry Daily Videos

3.12 Photoelectric Effect

Daily Video #1

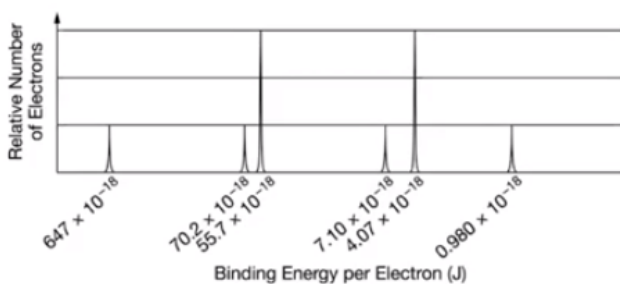
1. What is spectroscopy?



2. How is the wavelength of a photon related to the wavelength of the radiation?

3. How is the energy of a photon related to the frequency of the wave?

4. Pause the video at 2:13 and attempt the problem, then evaluate how you did and identify any errors

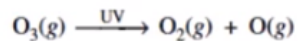


The complete photoelectron spectrum of an element in its ground state is represented above. Calculate the wavelength, in meters, of electromagnetic radiation needed to remove an electron from the valence shell of an atom of the element.

Hint: The valence shell has the LEAST binding energy!

5. Pause the video at 4:56 and attempt the problem, then evaluate how you did and identify any errors

In the upper atmosphere, ozone molecules decompose as they absorb ultraviolet (UV) radiation, as shown by the equation below. Ozone serves to block harmful ultraviolet radiation that comes from the Sun.



A molecule of $\text{O}_3(\text{g})$ absorbs a photon with a frequency of $1.00 \times 10^{15} \text{ s}^{-1}$. How much energy, in joules, does the $\text{O}_3(\text{g})$ molecule absorb per photon?

The minimum energy needed to break an oxygen-oxygen bond in ozone is 387 kJ mol^{-1} . Does a photon with a frequency of $1.00 \times 10^{15} \text{ s}^{-1}$ have enough energy to break this bond? Support your answer with a calculation.



Stop the video here
and try the problem
on your own!

Source: AP[®] Classroom

6. What are the key ideas from this video?