Question set of organic solar cells

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Question Set of Organic Solar Cells Question Yes, the resultant spectrum is unremitting which is explainable using classical mechanics. The hotness of the filament within the incandescent lamp makes it glows (Kragh, 2012). Atoms within the filament become extremely energetic, and the corresponding electrons within them begin vibrating at diverse frequencies thereby producing radiation. The spectrum of the bulb is viewed via a diffraction grating depicting all colors.

Question 2

The image composes of distinct colors that are mainly features of the gas, which explains utilizing Quantum Mechanics of the electrons within an atom solely exist within specific states (Kragh, 2012). Moreover, electrons in the transition radiate photons with enough energy that mainly correspond to the difference between the existing energy levels. Thus, it means light corresponds to the frequency of the photons it emits. In case the light is within the visible section of the spectrum, the observable colors mainly correspond to the transitions making other colors miss.

Question 3

The energy of the hydrogen atom within the nth quantum states is represented by

En=-13. 6Ev/n2

Computing the energy of the photons emitted when the underlying atoms transitions from n= 6 to corresponding n= 2 quantum states, the energy difference amidst the two states is

E2-E6= [-13. 6Ev/22]-[-13. 6Ev/62]

= -3. 02eV

Therefore, energy of the emitted photon equal to 3. 02eV

Question 4

Energy of the photon, E= hc/λ

λ= hc/E

= [6. 63*10-34J-s* 3. 0*108m/s]/ [3. 02*1. 6*10-19J/Ev

= 412nm

Question 5

Yes, it mainly corresponds to the underlying violet line within the image of the hydrogen spectrum.

Question 6

Energy of photon n= 1 to n= 2,

E2→1= E1-E2

=-13. 6eV [(1/12)-(1/22)]

=-13. 6Ev (3/4)

= -10. 2eV

Thus, E2→1 photon= +10. 2eV

E3→1= E1-E3

=-13. 6eV [(1/12)-(1/32)]

=-13. 6Ev (9/10)

= -12. 09eV

Thus, E3→1 photon= 12. 09eV

E4→1= E1-E4

=-13. 6eV [(1/12)-(1/42)]

=-13. 6Ev (15/16)

= -12. 75eV

Thus, E4→1 photon= +12. 75eV

Question 7

Corresponding wavelengths

Utilizing E= hc/λ

hc= λE

= 6. 63*10-34J-S*3. 0*108m/s

= 1. 989*10-25J-m

Thus, λ2→1= hc/Ɛ

= 1. 989*10-25J-m/[10. 2Ev*1. 6*10-19J/Ev

= 0. 122*10-6m

= 122nm

λ3→1= hc/Ɛ

= 1. 989*10-25J-m/[12. 09eV*1. 6*10-19J/Ev

= 0. 1028*10-6m

= 102. 8nm

λ4→1= hc/Ɛ

= 1. 989*10-25J-m/[12. 75eV*1. 6*10-19J/Ev

= 0. 0975*10-6m

= 97. 5nm

Question 8

The wavelengths mainly correspond to the light within the ultraviolet region, thus, making the light solely visible to the human eye.

Question 9

A phosphor is any material possessing the phenomenon of the luminescence. It encompasses phenomenon of the phosphorescence where transition occurs in the time interval of above 1ms and corresponding fluorescence, where transition occurs above tens of nanoseconds.

Fluorescent bulbs are typically coated on the interior side with phosphors, which absorb UV radiation (Kragh, 2012). Moreover, phosphors are carefully selected in order enable emitted radiation to recompense for the missing colors within the spectrum of the gas found within the bulb. White light (full spectrum) is emitted by the bulb. Moreover, dangerous UV radiation is absorbed by the underlying phosphors.

Question 10

The Bohr model predicted that the existence of electrons within the specific discrete energy levels, which does not contain energy amidst the existing energy levels but carry out transition from one energy level to the other (Kragh, 2012). The underlying atom absorbs a photon when transition occurs from a relatively lower level to the corresponding higher level. Conversely, the atom emits a photon when transition occurs from a relatively higher level to corresponding lower level.

Question 11

The Bohr Model offers an improper value for the prevailing ground rate orbital angular momentum. Moreover, it makes poor prediction concerning the spectra of relatively bigger atoms. Nevertheless, it was replaced by Sommerfeld’s prediction.

Reference

Kragh, H. (2012). Niels Bohr and the quantum atom: The Bohr model of atomic structure, 1913-1925. Oxford: Oxford University Press.