

Chem 155 Homework #7 Due at the start of class on Mon. Feb 23

Reading: Finish Chapter 15

Chapter 13 Problems:

13.35

Chapter 15 Problems:

15.13

15.15

15.30

15.32

15.83

15.94 (hint 1: the first ionization energy of K is 419 kJ/mol) (hint 2: if the photons arrive at exactly the same time so you don't have to worry about any intermediate states)

15.95

15.100

Additional Problems:

1) In class we discussed that the Planck distribution for blackbody radiation went to zero in the limit that λ went to zero. Use L'Hopital's rule to show that the Planck distribution formula also goes to zero energy density as λ goes to infinity (which is required so that the integrated energy density is finite).

2) Differentiate the Planck formula to find the wavelength for which the Planck blackbody distribution has its maximum at 300K. Compare this result to the result from the experimentally measured "Wein Displacement Law: $\lambda_{\text{max}} = 2.898 \text{ mm} \cdot \text{K}/T$ " to show that Planck's formula predicts the same peak position