

# Take Home Exam 07: Energy, wavelength and Matter

Assigned: 10/13/2022

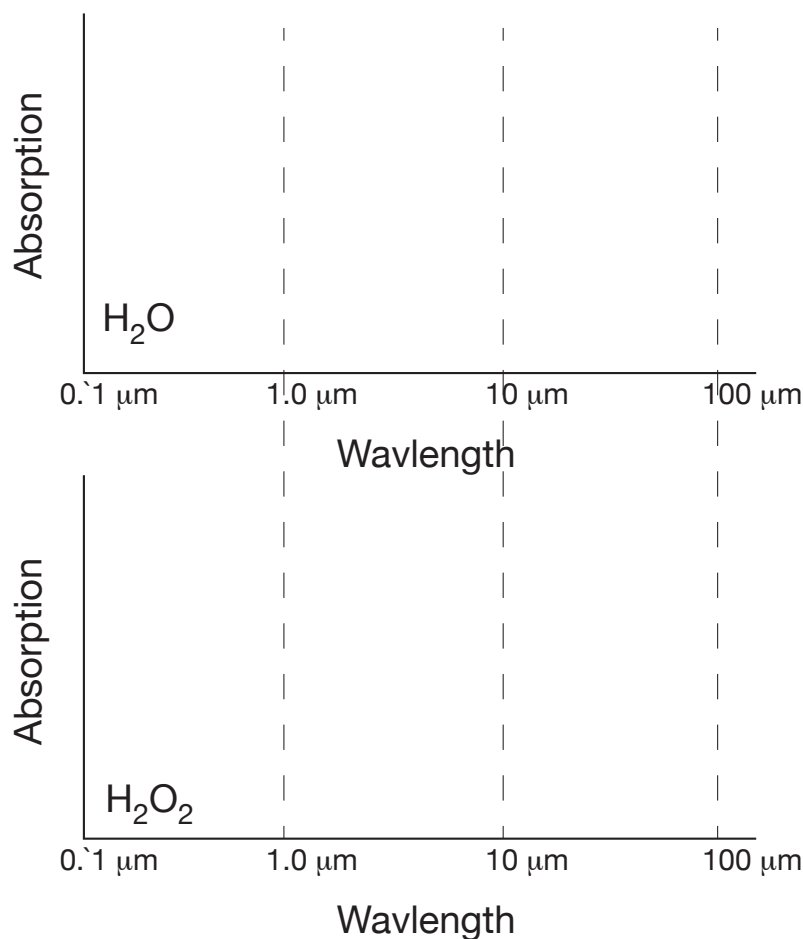
Due (as pdf by email) 10/16/2022 (Sunday)

## HW 07

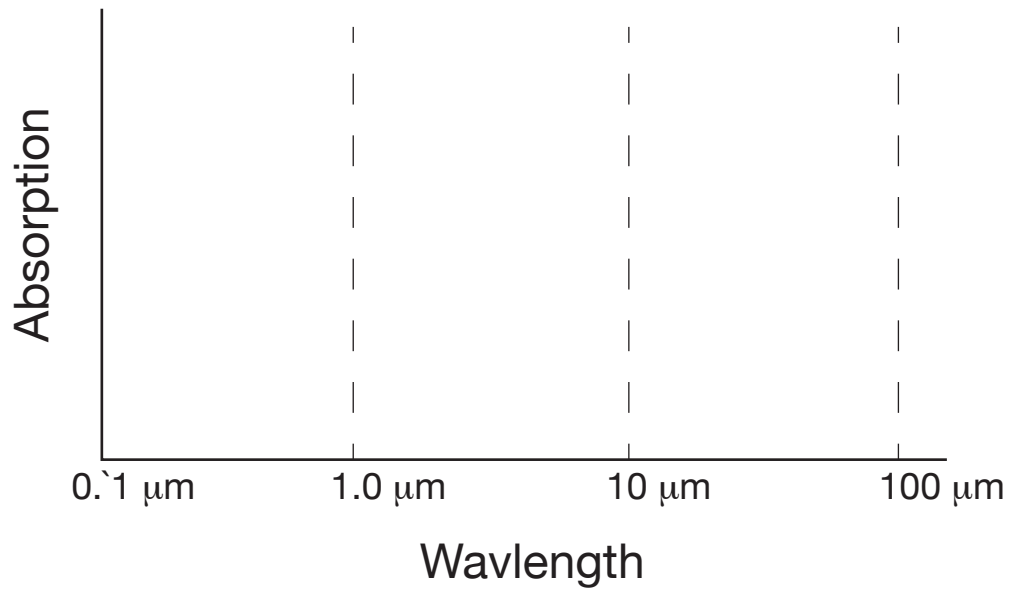
*Hint and Caution:*

*The questions below are of a qualitative nature. They ask for the "approximately" relative positions, and the number of expected absorption peaks as discussed in HW 07, which is based upon the stiffness of bonds. Bonds with higher stiffness will have a higher frequency and therefore absorb at shorter wavelength. I am asking you to provide your sense of the relative position of these peaks for different kinds of materials.*

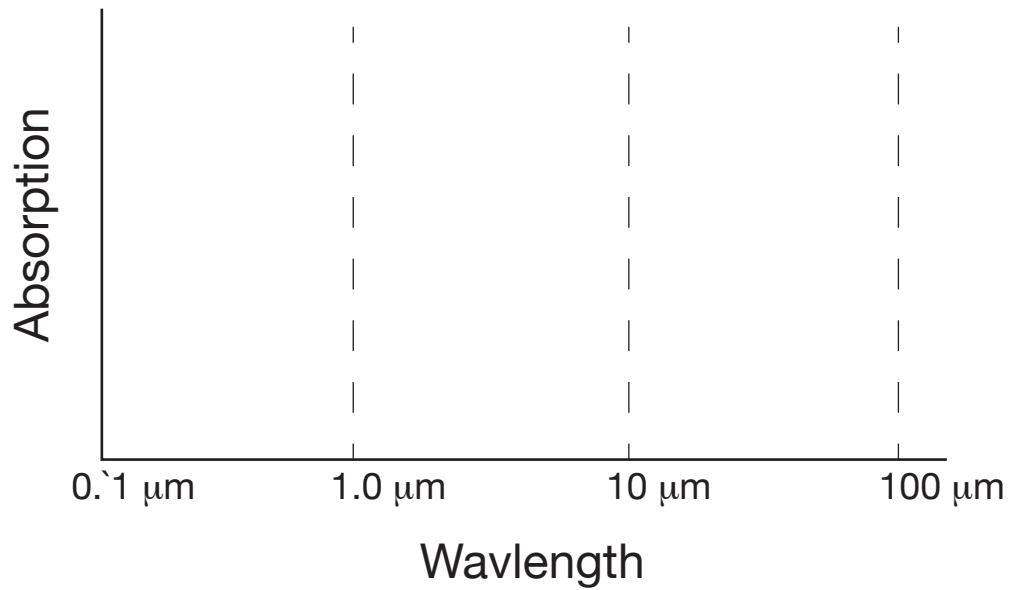
- Compare your expectations of patterns of absorption for molecules of  $\text{H}_2\text{O}$  and  $\text{H}_2\text{O}_2$  in the gas phase on the following graphs, highlighting the difference between them in the upper and the lower graphs.



- Compare the absorption pattern from an  $\text{H}_2\text{O}$  molecule with that of an organic macromolecule with many atoms, just below.



•Compare the spectrum from a glass like silica and the H<sub>2</sub>O molecule.



•Compare the spectrum from a CdSe semiconductor with a glass like silica just above

