Chem 420 – Sp12

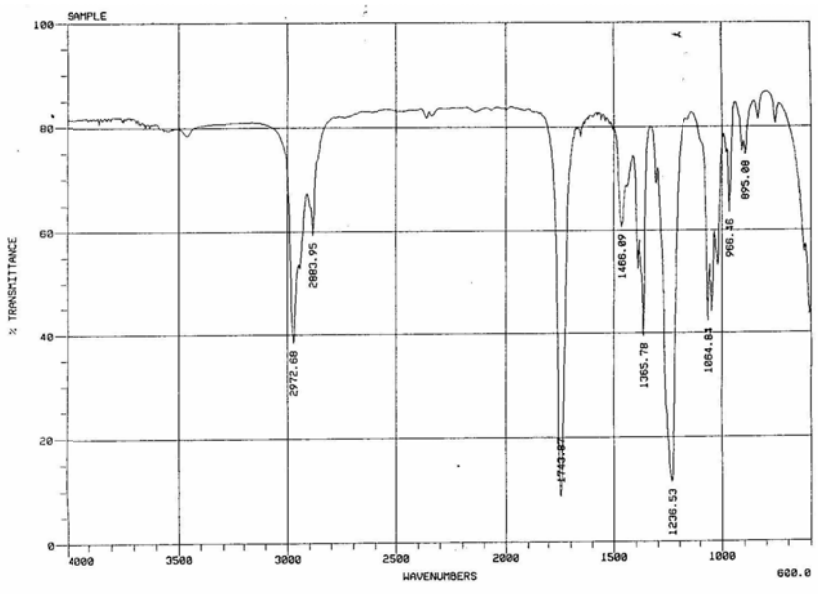
Spectroscopy Homework to Prepare for Exam 2

Text Homework

Chapter 15 – IR	Chapter 16 – 1H NMR
15.2 a-f	16.3
15.3 a-c	16.4 a, c, e, g, i, k
15.4	16.11
15.5 a, b	16.12
15.7	16.14
15.9 a-f	16.15 a-d
15.10 a-f	16.17 a-d
15.12 a-f	16.21 a, d, e, g
15.14 a-e	16.54

Additional Practice

1. Given the percent composition is 58.79% C, 9.89% H and 31.32% O with a molecular weight of 102.15 g/mol, determine the molecular formula and degrees of unsaturation. Indicate what functional groups are present in the IR spectrum. Give the line-angle structures for the 5 possible constitutional isomers. Remember – no 3 or 4-membered rings or cumulated dienes. Use accepted functional groups and the following molar masses – C: 12.01 g/mol; H: 1.01 g/mol; O: 16.00 g/mol.



2. Compound E is a high-boiling liquid that is slightly soluble in water. The IR and ^1H spectra for compound E are shown below. The peak at 4.15 ppm in the ^1H NMR disappears if the compound is exposed to D_2O. The percent composition of compound E is 78.65% C; 8.25% H; and 13.10% O. The molar mass of compound E is 122 g/mol. Propose a structure for compound E. Make sure to indicate the source of all significant IR absorption bands and show which hydrogens create the corresponding signals in the ^1H NMR spectrum.
   Note: Pay attention to the scaling of the IR spectrum.