Chemistry 2212 **Organic Chemistry II** **Spring 2003**

Week 4: covering material through the end of Chapter 12

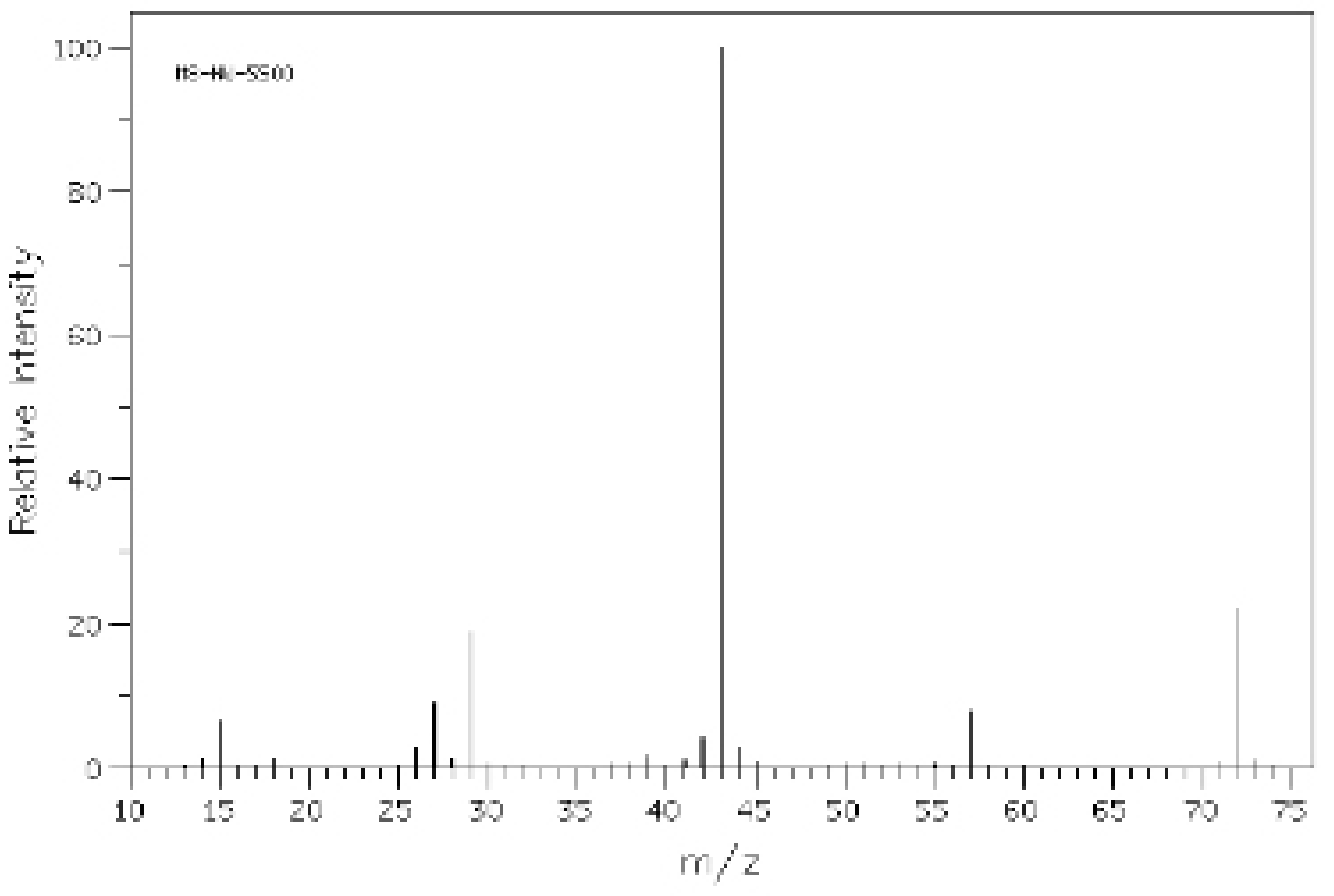
Major concepts from this week:

- Interpreting mass spectra of ethers, alcohols, and ketones
- Calculating the index of hydrogen deficiency (IHD)
- Infrared spectroscopy
- IR absorption bands for functional groups
- Interpreting infrared spectra

Problem solving

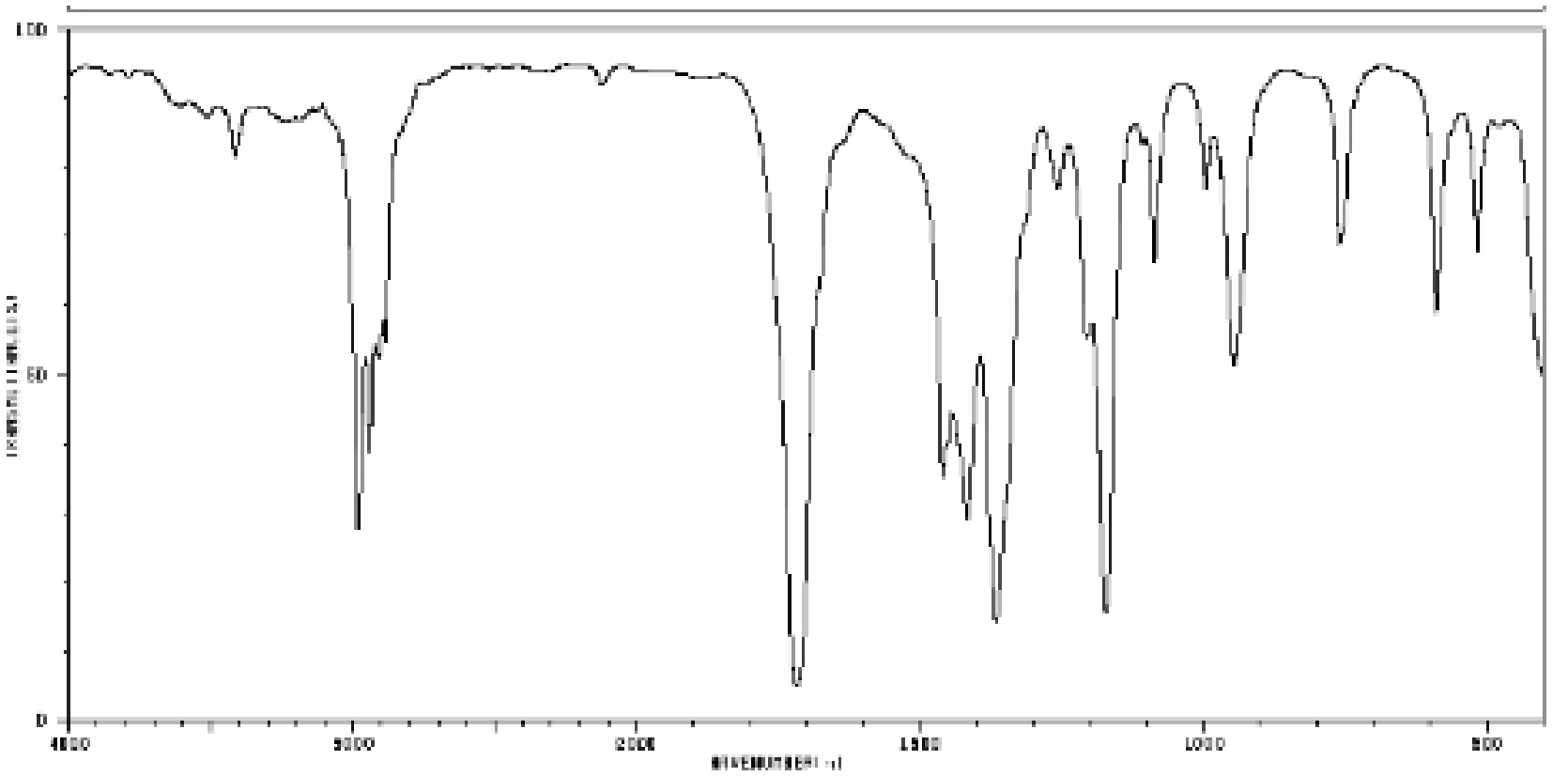
1. (a) An unknown compound was found on the shelf in your research lab. You sent the sample out for elemental analysis and learned that the molecular formula was C_5H_{12}. You also acquired a mass spectrum of the compound, which is shown below:

Give a structure for the compound that is consistent with the mass spectrum.

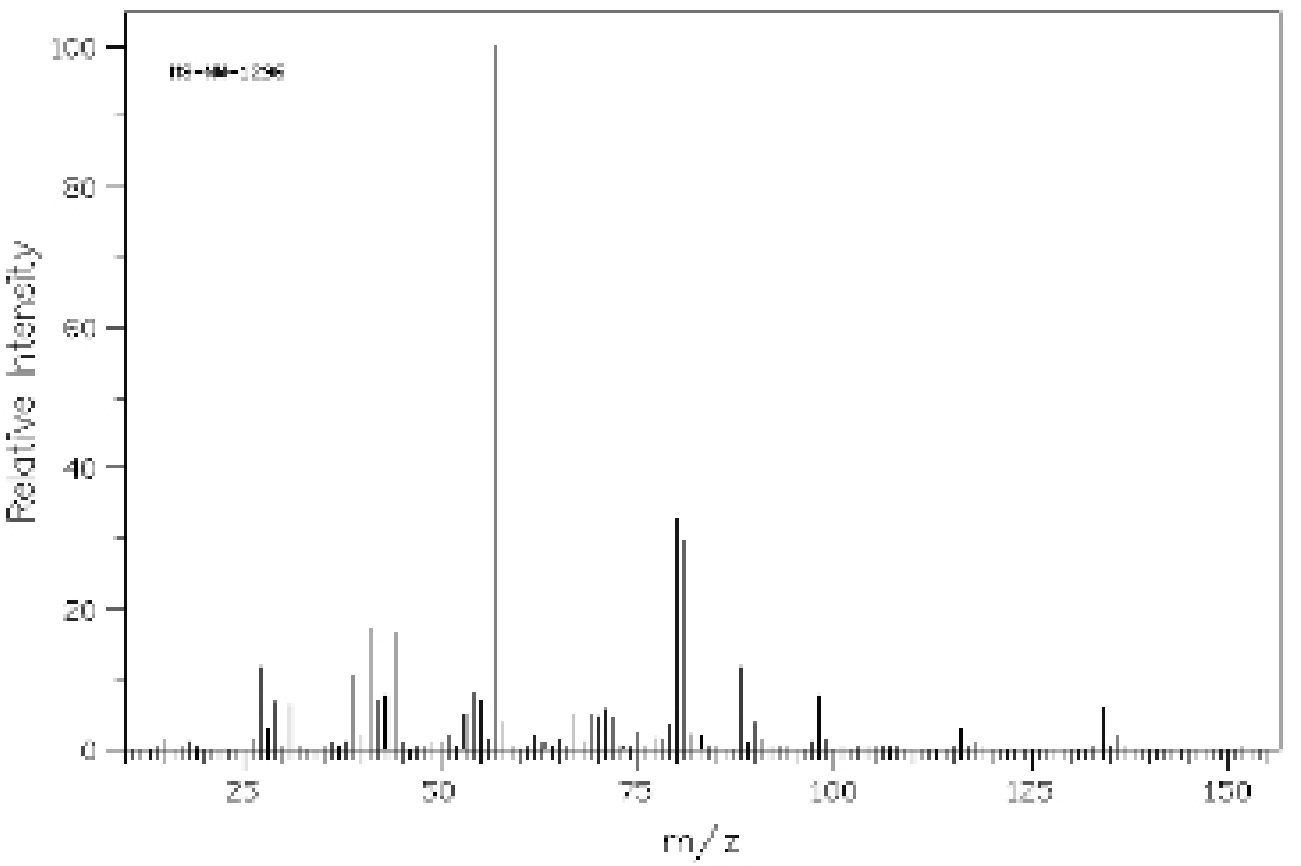


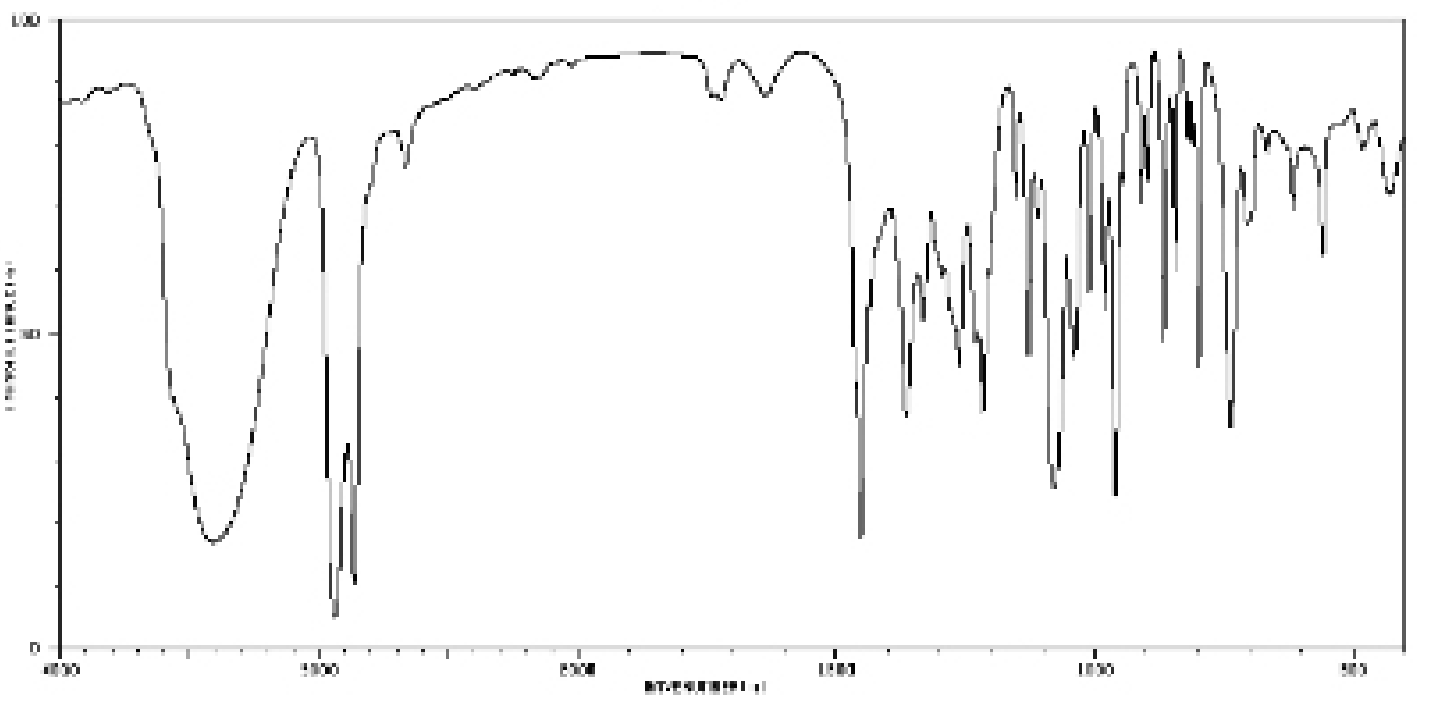
(b) You received a telephone call from the company who did the elemental analysis, who told you that the original elemental analysis was incorrect. The actual molecular formula was C_4H_8O. Assuming that the new formula is correct and using the same mass spectrum, deduce a structure that is consistent with the mass spectrum.

c) Not trusting the analysis company, you acquired an infrared spectrum of the compound that is shown below. What is the structure of your unknown compound? Support your answer!



2. Here are the mass and IR spectra of an unknown compound with a molecular weight of 134.5 g/mole:





(a) Does the compound contain a halogen atom? If so, which halogen?

b) Does the compound have a functional group containing oxygen? If so, which one?