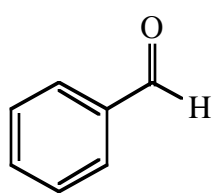


Infrared Spectroscopy

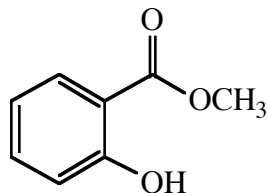
Additional Reading: Handout on using the IR machine

Experimental Procedure

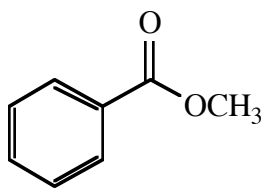
Along with a lab partner, obtain the IR spectrum of each of the following compounds. Each of you should run at least four samples. In addition, obtain an IR of your synthesized alkene if your lab instructor requires this. You can decide whose product you want to take an IR of. Who had the more pure product for that experiment?



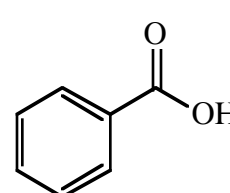
benzaldehyde



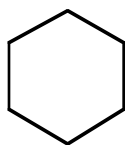
methyl salicylate



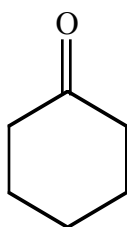
methyl benzoate



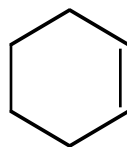
benzoic acid



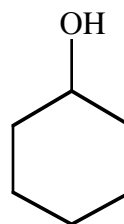
cyclohexane



cyclohexanone



cyclohexene



cyclohexanol

These compounds are all liquids, except for benzoic acid. Use the NaCl plates to take the IR's. The NaCl plates are in the dessicators near the IR machine. You will only need to put one or two drops of the liquid on one plate before putting the other plate on top. Your compound is now "sandwiched" between the two NaCl plates. Now you can place this "sandwich" in the sample holder and run your IR! Do not touch the flat surfaces of the NaCl plate. If you do touch them, you will obtain an IR of your greasy fingerprint! After using the windows, clean them in the hood with the acetone and allow them to dry before putting them back in the dessicator.

When obtaining an IR of a solid, you will need to make a KBr disc that contains your solid imbedded in the plate. To do this, you should make ~ a 10:1 mixture of KBr : your solid in the tiny mortar and pestle located in the IR room. You will only need to use a few milligrams of your solid here. Grind this mixture thoroughly with the mortar and pestle. Then place the window and the piece with the short peg together (there are 3 pieces - one with a circular window and two with pegs that fit in the window). Place just enough of your ground-up mixture in the circular window to make a thin layer covering the bottom. Then put the third piece - the one with the longer peg - in the hole of the window. Put this "metal sandwich" in the press and pull the lever to squeeze it together. Carefully remove this assembly from the press (your lab instructor will demonstrate the use of the press), and carefully pull the outside pieces away. You should have a translucent window of KBr with your solid imbedded in the window. This might take some practice to get it right the first time. The KBr is hygroscopic (it absorbs water out of the air), so you will find it in the dessicator. **This is where you should put it after you are done with it!** Otherwise there will be an O-H peak in everyone's IR! Make sure to clean everything with acetone when you are done.

For each of the IR's you and your partner have obtained, assign the peaks on the IR spectrum and hand in these spectra.

Each one of you will also need to obtain an IR spectrum of an unknown. Your unknown will be one of the compounds shown below. Identify your unknown, and **explain how you arrived at your answer**. A good way to do this is to explain how you eliminated all the other structures. What peaks were missing that allowed you to eliminate all the structures except your final answer?

