Saturated vs. Unsaturated Hydrocarbons Lab
Chemistry 2
NIVA International School 2010-2011

Thoroughly read the entire procedure before starting the lab.

Note: This lab will be submitted as a formal lab report. All observations must be properly recorded, in pen, on your data sheet, and submitted with your formal lab report.

Materials:
- Goggles
- Test tube rack
- 9-6" test tubes
- Test tube clamp
- 2-hole rubber stopper
- 8 solid rubber stoppers
- 2 Droppers
- Forceps
- Rubber tubing
- Wood splints
- Glycerol
- 10 mL graduated cylinder
- Large tube
- Scoopula
- Permanent marker

Chemicals:
- Methane (gas line)
- $KMnO_4$
- NaClO
- 30% HCl
- 3g CaC_2
- Sand

Procedure:

Part I - Saturated Hydrocarbons

1. Fill four test tubes with water and invert them in a large beaker approximately half full of tap water. You will collect a gas in these test tubes.
2. Fix one end of the rubber tubing to the valve of a Bunsen burner.
3. Place the other end of the tube at the mouth of one of the inverted test tubes.
4. Open the valve of the gas supply and allow the gas to bubble into the test tube. When the first tube is filled with gas, discard it.
5. Fill the remaining three test tubes in the same way. As each tube is filled, stopper it and place it in a test tube rack.
6. Place one of the three test tubes from step 5 stoppered end up in a test tube clamp.

WAIT AT THIS STEP UNTIL EVERYONE HAS FILLED THEIR 4 TEST TUBES WITH GAS AND THE GAS LINE HAS BEEN DISABLED BEFORE PROCEEDING TO THE NEXT STEP.

7. Light a wood splint; remove the stopper from the test tube in the clamp and place the burning splint at the mouth of the test tube. Record your observations on your data sheet.
8. Open one of the other test tubes and place 3 mL of $KMnO_4$ in the tube. Record your observations on your data sheet.
9. Add 3 mL of household bleach to the fourth test tube. Stopper the tube. Record your observations on your data sheet.
10. Remove the stopper from the test tube with bleach and add 1 mL of HCl to the test tube to produce chlorine gas. Stopper the test tube. Record your observations.
11. Label each test tube and set aside on your rack.

Part II - Unsaturated Hydrocarbons

1. Fill four test tubes with water and invert them in a large beaker approximately half full of tap water.
2. Add sand to another test tube until the tube is about three quarters full.
3. Use forceps to place two or three pieces of calcium carbide on the surface of the sand in the tube.
4. Lubricate the end of a glass dropper with glycerol and insert it into one hole of a two-hole stopper. Remove the bulb from the dropper.
5. Fill a second dropper with water. Being careful not to release any water, insert this dropper into the other hole of the stopper.
6. Put the stopper assembly into the test tube and secure it in a test tube clamp.
7. Attach one end of a rubber tube to the end of the glass tube from the dropper. Place the other end of the rubber tube at the mouth of one of the test tube inverted in the beaker of water.
8. Add a few drops of water to the CaC by squeezing the dropper inserted in the stopper. Caution: Water reacts with calcium carbide to form calcium hydroxide (a strong base) and ethyne.
9. When the inverted test tube is filled with gas, discard it because the gas will be mixed with air.
10. Repeat the process to fill the remaining three tubes with gas.
11. Repeat steps 6-11 of the procedure in Part 1.
12. Dispose of the contents of all test tubes by placing the tubes in a test tube rack and moving it to the fume hood. Once inside the fume hood, unstopper all test tubes and lower the glass shield.