Worksheet – Alcohols

Alcohols are compounds with hydroxyl (-OH) groups on sp³ hybridized carbons. This introduces H-bond donors and acceptors which influence the physical properties of alcohols. They possess a nucleophilic site, the lone pairs of e⁻ on the oxygen. They are named based on the longest carbon chain containing the –OH group, which is given the smallest possible number. Rings are numbered from this carbon.

1. Name the following compounds:

   a. 
   b. 
   c. 

2. Alcohols are characterized by the type of carbon bonded to the –OH group, 1°, 2° or 3°. Characterize the order of each of the alcohols in problem 1.

   a. ________  b. ________  c. ________

3. Order the following molecules from lowest to highest boiling point. What IMF does each have?

   a. 
   b. 
   c. 

4. Alcohols can be formed by the hydration of alkenes.
   a. Write the mechanism for the hydration of 1-butene to form an alcohol using curved arrows and labeling all charged species. There will be two products. Label them as major or minor.

   **step 1**

   **step 2**

   **step 3**

   b. Starting with the major product of this reaction, write a mechanism that converts it to an alkene and water. Again, used curved arrows and label all charged species. There will be **two** different products. Label them as major and minor.

   **step 1**

   **step 2**

   **step 3**
5. Draw and name the product(s) of the following reaction.

![Chemical structure]

6. When high concentrations of alcohol are present, they can undergo an acid catalyzed condensation reaction. Two alcohols combine to form a larger molecule, an ether, plus water. Fill in the missing intermediates in the following reaction mechanism.

**step 1**

![Intermediate 1]

**step 2**

![Intermediate 2] + H₂O

**step 3**

![Intermediate 3]

**step 4**

![Intermediate 4] + H⁺