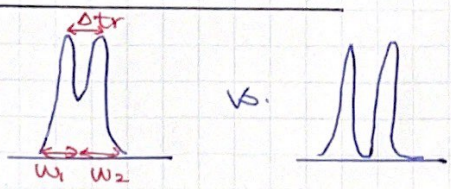
Exp. No. 9	Experiment/Subject CHEM438 (GCH)	Date 11/8/2021	
Name Abdul Fayeed	Lab Partner	Locker/ Desk No.	Course & Section No. 021L

PRELAB Questions

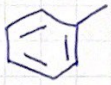
1. 

Resolution means the ability to separate the two signals. Peak on the left showed poor resolution as opposed to the peaks on the right.

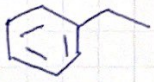
Resolution = $\frac{\Delta tr}{W_{AV}}$, Δtr is the separation between peaks in unit of time, and W_{AV} is the average width of the two peaks. $\frac{W_1 + W_2}{2} = W_{av}$.

2. cyclohexane

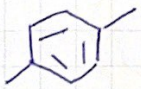
toluene



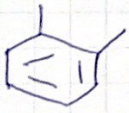
Ethyl benzene



para-xylene



Ortho-xylene



3. Ethyl benzene and para-xylene will be the most difficult to resolve because they have very similar boiling points. (only differ by 2.2°C)

4. At high temperature, the chromatographic peaks will come out earlier. High temperature causes the solute to elute the column faster, decreasing the retention time.

5. The resolution is expected to degrade at high temperature. As the retention time decreases as the temperature increases, the peaks will start to get closer together. The resolution of the peaks will get poorer

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Objectives

The purpose of this experiment is to separate mixtures of volatile compounds and quantitate the comparition of hydrocarbons in the mixture through gas chromatography at two different temperatures.

Introduction

Gas chromatography is used to separate mixtures of volatile compounds. Volatile compounds are in equilibrium with the mobile and stationary phases as they elute the column, which is described by the equilibrium constant. The retention time is directly related to the equilibrium constant. For the experiment, a set of mixture will be analyzed at a constant temperature at two different temperatures.

Procedure

1. Perform isothermal separation of mixture at 80°C and 120°C at P = 1 psi. Gas mobile phase used is H_2.
2. Run the pure compounds of cyclohexane, toluene, ethyl benzene, para-xylene and ortho-xylene in the GC at T = 80°C.
3. Run the mixture of the compounds at both temperature.
4. Prepare small vials with samples before running in the GC.
5. Record and print out the chromatograms

Conclusion

Gas chromatography can be used to quantitate the compounds in a mixture and to separate them in the column based on their retention time, only for volatile compounds.

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