وزارة التعليم العالي والبحث العلمي
جامعة المستقبل
كلية الصيدلة

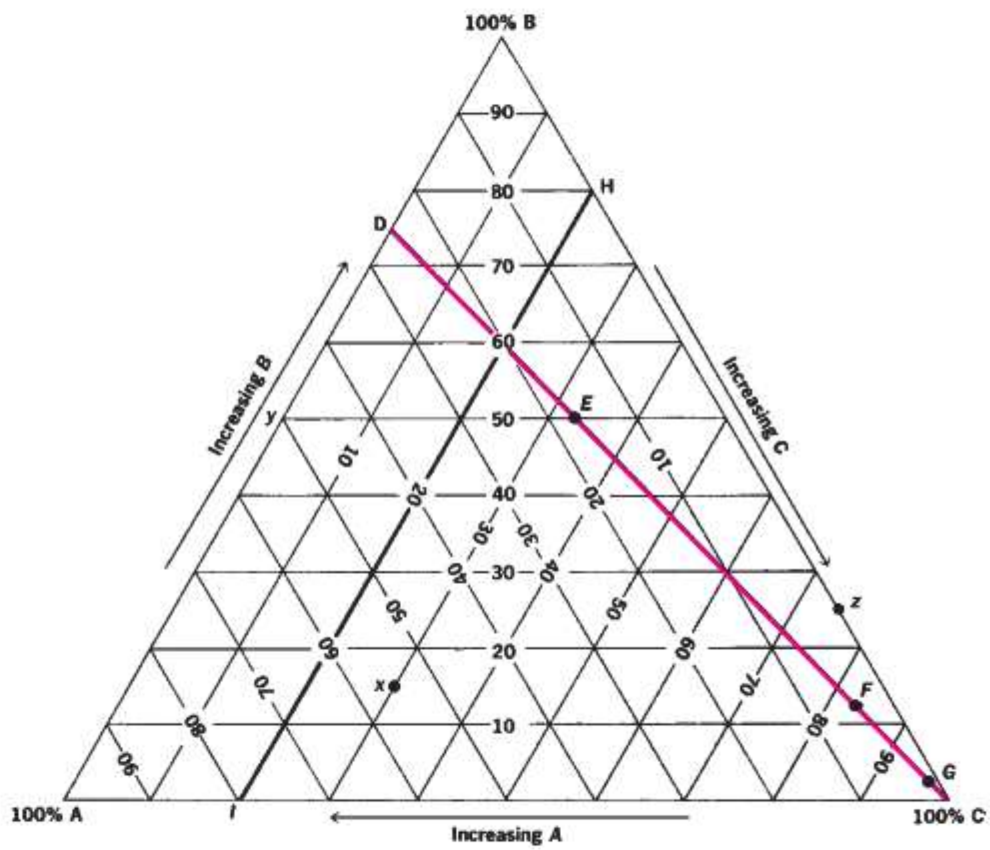
مختبر الصيدلة الفيزياويه I / المرحلة الثانية

Three component systems

Lab.3

Introduction

it is essential that the reader becomes familiar with certain “rules” that relate to the use of triangular coordinates. It should have been apparent in discussing two-component systems that all concentrations were expressed on a weight–weight basis. This is because, although it is an easy and direct method of preparing dispersions, such an approach also allows the concentration to be expressed in terms of the mole fraction or the molality. The concentrations in ternary systems are accordingly expressed on a weight basis



The triangular diagram for three-component systems.

Rules relating to the triangular diagram

1- Each of the corners or apexes of triangle represent 100% by weight of one component (A, B & C) as a result ,the same apex will represent 0% of the other two components.
2- The area within the triangle represents all possible combinations of A, B& C to give three component systems.
3- If a line is drawn through any apex to a point on the opposite side, then all systems are represented by points on such line have constant ratio of two components.
4- Any line drawn parallel to one side of the triangle represents ternary systems in which the proportion (or % by weight) of one component is constant.

Example*:*

The area within the triangle represents all the possible combinations of *A*, *B*, and *C* to give three-component systems. The location of a particular three-component system within the triangle, for example, point *x*, can be undertaken as follows

The line *AC* opposite apex *B* represents systems containing *A* and *C*. Component *B* is absent, that is, *B* = 0. The horizontal lines running across the triangle parallel to *AC* denote increasing percentages of *B* from *B* = 0 (on line *AC*) to *B* = 100 (at point *B*). The line parallel to *AC* that cuts point *x* is equivalent to 15% *B*; consequently, the system contains 15% of *B* and 85% of *A* and *C* together

Applying similar arguments to the other two components in the system, we can say that along the line AB, C = 0. The point x lies on the line parallel to AB that is equivalent to 30% of C. It follows, therefore, that the concentration of A is 100 - (B + C) = 100 - (15 + 30) = 55%. This is readily confirmed by proceeding across the diagram from the line BC toward apex A; point x lies on the line equivalent to 55% of A. Then find the percent of H, E, F, and G?
(Another example is used in the presentation)

Experimental

Part l:

prepare acetic acid (HAC), CHCl3 and distilled water as well as conical flasks and burettes

Part ll:

1- Prepare 10 gm of the following combinations of HAC & $CHCl_3$:5%, 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90% w/w HAC: $CHCl_3$ in a small clean & dry flask which form one single phase
(S.G. for HAC =1.009 and $CHCl_3$ =1.3).
2- Add the water slowly to the prepared mixtures from a burette until a turbidity appears. Check the weight of water (which is equal to its volume)

3- Obtain a miscible curve by calculating the percent w/w of each component in the turbid mixture and plot this triangular diagram

laboratory report

Follow the general instructions for written laboratory reports.

	Weight of each component (g)			Weight percentage of each component (%w/w)		
Flask No.	HAc	$CHCl_3$	H_2O	HAc	$CHCl_3$	H_2O
1						
2						
3						
4						
5						
6						
7						
8						
9						
10