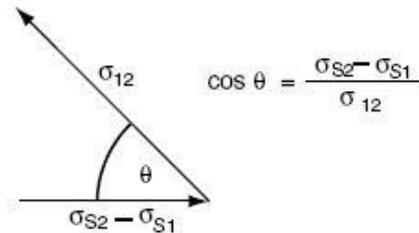


## CHZ 224 SURFACE AND COLLOID CHEMISTRY

### EXPERIMENT #2: MEASUREMENT OF CONTACT ANGLE AT S/L INTERFACES

#### 1. Introduction

Contact angle is a measure of the wettability of a solid by a liquid.



Thus, at equilibrium state, the contact angle will be given by Young's equation as;

$$\sigma_{12} \cos \theta = \sigma_{S2} - \sigma_{S1}$$

Where  $\sigma_{12}$ ,  $\sigma_{S1}$ , and  $\sigma_{S2}$  are the interfacial tensions at the respective interfaces. Although this equation was originally proposed on the basis of a mechanical analysis of the resultant forces at the three-phase contact line, it has since been derived rigorously on the basis of fundamental thermodynamic principles. While Young's equation provides a thermodynamic definition of the contact angle, its experimental verification is prevented by the fact that the values of  $\sigma_{S1}$  and  $\sigma_{S2}$  cannot be directly determined experimentally. In this sense, the contact angle of a liquid on a solid differs from that of a liquid on a second liquid since in the latter case all three interfacial tensions can be determined independently and the relationship can therefore be verified directly.

#### 2. Materials and Method

Goniometer is the traditional method to measure contact angles at solid/liquid or solid/air interfaces. The basic elements of a goniometer include a light source, sample stage, lens and image capture. Contact angle can be assessed directly by measuring the angle formed between the solid and the tangent to the drop surface. In this experiment, contact angle measurements will be carried out with Dataphysics OCA 50 Contact Angle measurement device by dripping distilled water by syringe with 1 ml volume on surfaces with different wettability features like glass and teflon.

#### 3. Experimental Procedure

1. Clean the sample surfaces carefully
2. Allow a drop of distilled water on the glass plate or teflon surface and measure the contact angle.

#### **4. Report**

1. Write step by step how you performed the experiment
2. List possible reasons for measuring contact angle in a few sentences of your own words.
3. Comment on your results for each case.
4. What is the difference between the contact angles on different solid substrates? What is the reproducibility of the tests?