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MICELLAR DISSOCIATION OF TPGS-1000 IN WATER: SYSTEM DYNAMICS OR MICELLE-SOLVENTS INTERACTION

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ABSTRACT

Three different series of TPGS-1000 that are series A, B and C with different concentration were prepared by using the simple dilution method in which the distilled water was directly added to the surfactant, TPGS-1000. This study deals with the system dynamics and the micelles-solvent interaction involving the TPGS-1000 and deionised water. The experimental parameters such as the viscosity, activation energy, the A_F and B_J constant representing the micelle-micelle and micelle-solvent interaction, the molar volume, and the M and K constant which give the interaction between the micellar fragment and solvent, have been studied and estimated so to understand the system dynamics and the solute-solvent interactions within a solution system. It is observed that the obtained data can be described as micellar dissociation. The measured parameters, those complimented each other have been discussed in terms of the surfactant-solvent interactions which in turn support the occurrence of micellar dissociation.

CHAPTER 1

INTRODUCTION

1.1 Background

A System which usually consists of both solvent and solute, in this case TPGS-1000, the amphipiles molecule that will undergo micellisation like any other surfactants molecules and the dynamics will explain about the orientation of the solvent around the solute. In this case, because we are dealing with surfactant, it will have their own orientation within the solvent. For example, they will remain at the surface. At higher concentration, they will form micelles and increase in concentration will lead to fragmentation of the micelles. These orientational changes will affect the structure of the solvent i.e. either structure breaking followed by structure making or in the form of solvation and de-solvation. For all these to happen, there will be a specific energetic that will play a role.

Surface active agents is a substance that is amphiphilic in nature in which it consist of both polar and non-polar moieties. The hydrophilic part, often the ionic group, is the most soluble surfactants as ions have higher affinity towards water due to the electrostatic attraction and are able to attract long hydrocarbon chain with them into the solution. The polar head of the surfactant interact with water while the non-polar part are secluded in the inner region.