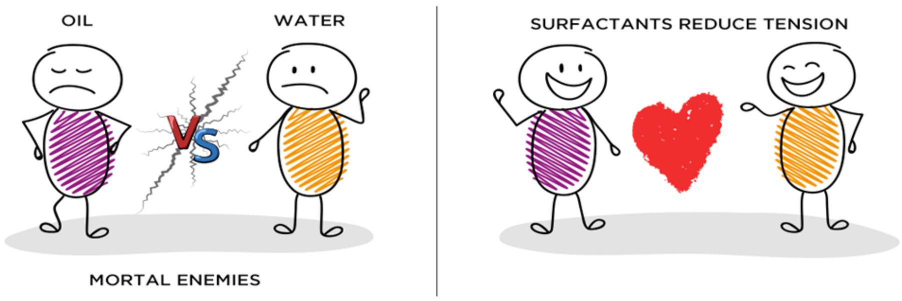
PROPOSED RESEARCH PLAN

INTRODUCTION

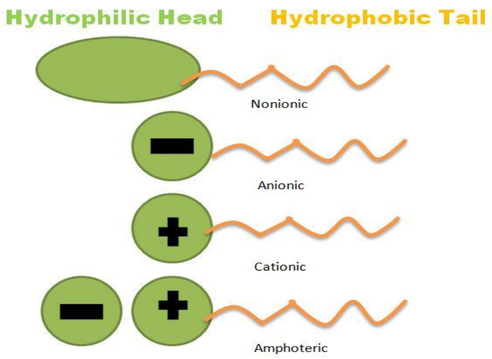
SURFACTANTS

SURFace ACTive AgeNT' - a surfactant (are also known as amphiphiles or tensides) is a molecule that lowers surface tension and has a distinct molecular structure that gives rise to their molecular properties. The word amphiphile was coined by Paul Winsor 50 years ago. It comes from two Greek roots. (amphi means "double", "from both sides", "around", or amphibian and the root philos which expresses friendship or affinity). The polar portion exhibits a strong affinity for polar solvents, particularly water, and it is often called hydrophilic part or hydrophile. The apolar part is called hydrophobe or lipophile, from Greek roots phobos (fear) and lipos (grease) [Figure 1].



CLASSIFICATION AND STRUCTURE OF SURFACTANTS

The most accepted and scientifically sound classification of surfactants is based on their dissociation in water. Surfactants are said to be classify into four broad categories: anionic, cationic, amphoteric and nonionic.



Anionic Surfactants give rise to a negatively charged surfactant ion (hence anionic) and a positively charged counter ion upon dissolution in water.

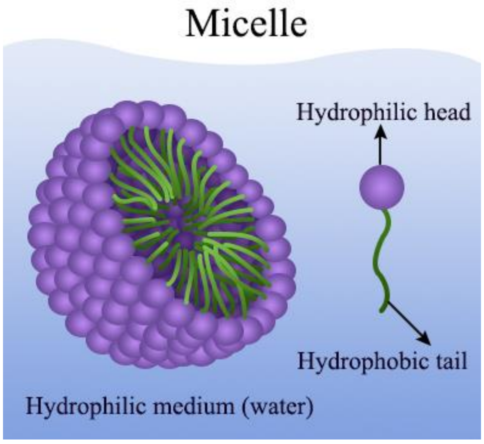
Cationic Surfactants yield a positively charged surfactant ion (hence cationic) and a negatively charged counter ion upon dissolution in water.

Amphoteric or Zwitterionic When a single surfactant molecule exhibit both anionic and cationic dissociations it is called amphoteric or zwitterionic.

Nonionic Surfactants are characterized by hydrophilic head groups that do not ionize appreciably in water.

MICELLES AND MICROEMULSIONS

When the surfactant molecules dissolve in water they form a monolayer. This monolayer formed lower surface tension as function of the excess surfactant concentration (Baviere, 1991).



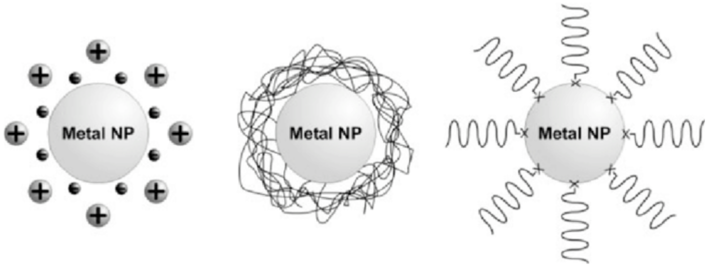
At the correct saturation and temperature, surfactant molecules aggregate into micelles, with the HC parts towards inside in a dynamic equilibrium with the non micellated molecules. (Baviere, 1991) Micelles form a concentration called Critical Micelle Concentration and it is identified by a change in the properties of the solution. The micellization helps to increase the surfactant solubility.

OBJECTIVES

The application of enhanced-oil recovery (EOR) methods during oil production lead to the formation of water-in-crude oil emulsions. The pros and cons of emulsion formation have motivated significant research in the oil industry in the last few decades. Therefore, the objective of this study is to contribute to the understanding of water-in-crude oil emulsions stabilizing mechanisms. In this regard, several parameters affecting the stability of water-in-oil emulsions are examined including oil-to-water ratio, surfactant type (Cationic and non-ionic surfactants were used), aqueous phase composition and temperature.

On the other hand, it has been suggested that solid content is a good predictor of emulsion stability in oil operations. Generally, the most stable emulsions are found when interfaces are stabilized by the smallest particles. Therefore, stabilization mechanisms for water-in-oil emulsions are also investigated in the presence of some metal oxide nanoparticles.

GENERAL SCHEME OF THE PROPOSED WORK



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