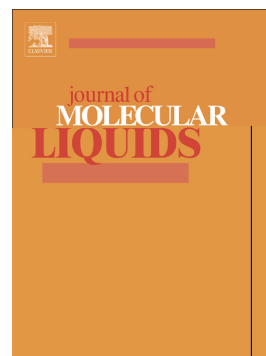


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A study on the effect of dynamic interfacial tension on the stability of Nano-emulsified diesel

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Abstract

This paper aims to study the stability of water-in-diesel nanoemulsion from points of view of surfactant type and change in water droplet size. The surfactant type was chosen by studying the dynamics of interfacial tension changes between water and pure diesel at different diluted concentrations of individuals emulsifiers. The used emulsifiers were differing in their Hydrophilic-Lipophilic Balance (HLB) namely; polysorbate (85) and sorbitan oleate and its blend denoted as (P), (A) and (MPA), respectively. On the other hand, the kinetics change of water droplet size was studied in case of using different emulsifiers concentrations and water contents. The emulsifiers concentration ranging from 4 to 10 wt.% , while the water contents ranging from 5 to 7 wt.% of the total weight of the nanoemulsions. The results detected that although the minimum water droplet size ($r=26.4$ nm) was obtained in case of using surfactant of type (MPA) at concentration equal to 10 wt.% and 5 wt.,% of water contents yet, the minimum equilibrium interfacial tension value (γ_{eq}) as 5.1 mN m⁻¹ was gained by surfactant type of (A). Therefore, not only the interfacial tension (γ_{eq}) of used surfactant dominates the kinetics of change in droplet size, but also its type.

Key words: Nanoemulsion; Ostwald ripening; Dynamic interfacial tension.

1. Introduction

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