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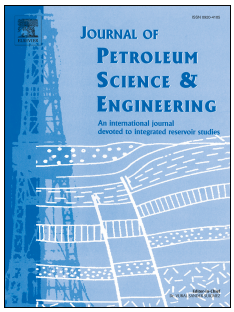

Long chain imidazolium ionic liquid and magnetite nanoparticle interactions at the oil/water interface

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Long chain imidazolium ionic liquid and magnetite nanoparticle interactions at the oil/water interface

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ABSTRACT

The influence of the long chain ionic liquid 1-hexadecyl-3-methyl imidazolium chloride on equilibrium and dynamic interfacial tensions of *n*-heptane/water, as a representative system of oil/water, was investigated. Interfacial tension was drastically decreased by the ionic liquid and presence of magnetite nanoparticles as low as 0.01 wt%. Alkaline pH intensifies this effect. It was while nanoparticles alone had no sensible effect. The equilibrium interfacial tension data were nicely reproduced by the Szyszkowski model. Accordingly, the saturated surface excess for the systems with nanoparticles was decreased compared to the particles free case, but the adsorption equilibrium constant was increased. The dynamic interfacial tension data, on the other hand, showed a good agreement with the mixed diffusion-kinetic control theory for the both cases. Further, the stability of different emulsions was investigated. The results showed that the used nanoparticles were poor emulsifying agent, but the emulsion stability was increased when accompanied with the ionic liquid. Finally, the contact angle of aqueous phase drops surrounded by *n*-heptane on quartz surface was consistently decreased with the ionic liquid concentration and was more in the presence of nanoparticles.

Keywords: Interfacial tension; Interface adsorption; Imidazolium ionic liquids; Magnetite nanoparticle; Mixed diffusion-kinetic-control

1. Introduction

Ionic liquids (ILs) are a class of organic molten salts whose physical and chemical properties can be changed by altering their cation or anion. Some excellent properties of ILs

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