

Accepted Manuscript

Title: Thermal Response of a Non-Ionic Surfactant Layer at the Water/Oil Interface During Microwave Heating

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PII: S0927-7757(18)30679-4
DOI: <https://doi.org/10.1016/j.colsurfa.2018.08.010>
Reference: COLSUA 22725

To appear in: *Colloids and Surfaces A: Physicochem. Eng. Aspects*

Received date: 11-7-2018
Revised date: 6-8-2018
Accepted date: 7-8-2018

Please cite this article as: Shibata Y, Hyde A, Asakuma Y, Phan C, Thermal Response of a Non-Ionic Surfactant Layer at the Water/Oil Interface During Microwave Heating, *Colloids and Surfaces A: Physicochemical and Engineering Aspects* (2018), <https://doi.org/10.1016/j.colsurfa.2018.08.010>

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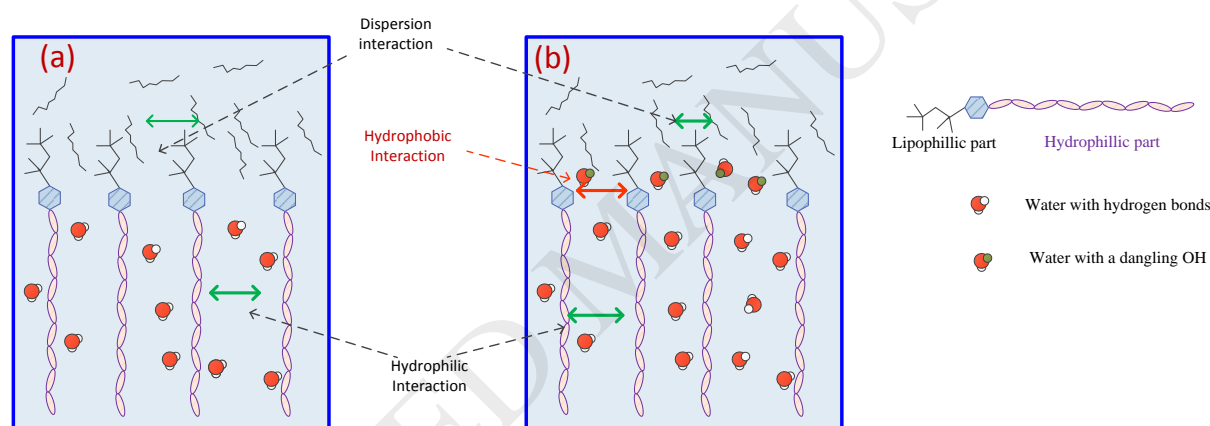
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Graphical abstract



Abstract

This study measured *in-situ* the interfacial tension of the decane/water interface during microwave radiation, in the presence of the non-ionic surfactants Triton X-100 and X-405. It has been found that the two surfactants, with different hydrophilicity, displayed contrasting responses to the microwave heating. For X-100, the interfacial tension increased with the solution temperature. However, for X-105, the tension decreased as the solution temperature rose. The tension-temperature trends were consistent for a range of different microwave pulsing patterns. The results can be explained by considering the molecular origins of the interfacial forces. In particular, a semi-quantitative analysis verified that the hydrophobic

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