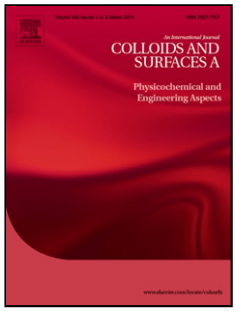


Title: New surfactant mixtures for fine foams with slowed drainage

Authors: Krastanka G. Marinova, Kristina T. Naydenova, Elka S. Basheva, Frederic Bauer, Juergen Tropsch, Juergen Franke

PII: S0927-7757(17)30310-2
DOI: http://dx.doi.org/doi:10.1016/j.colsurfa.2017.03.050
Reference: COLSUA 21498

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

Received date: 27-1-2017
Revised date: 22-3-2017
Accepted date: 22-3-2017

Please cite this article as: Krastanka G.Marinova, Kristina T.Naydenova, Elka S.Basheva, Frederic Bauer, Juergen Tropsch, Juergen Franke, New surfactant mixtures for fine foams with slowed drainage, Colloids and Surfaces A: Physicochemical and Engineering Aspectshttp://dx.doi.org/10.1016/j.colsurfa.2017.03.050

New surfactant mixtures for fine foams with slowed drainage

Krastanka G. Marinova,[§,*] Kristina T. Naydenova,[§] Elka S. Basheva,[§]
Frederic Bauer[†], Juergen Tropsch,[†] Juergen Franke,[†]

[§] *Department of Chemical & Pharmaceutical Engineering, Faculty of Chemistry and Pharmacy, Sofia University, James Bourchier Ave 1, 1164 Sofia, Bulgaria*

[†] *BASF SE, Carl-Bosch-Strasse 38, 67056 Ludwigshafen, Germany*

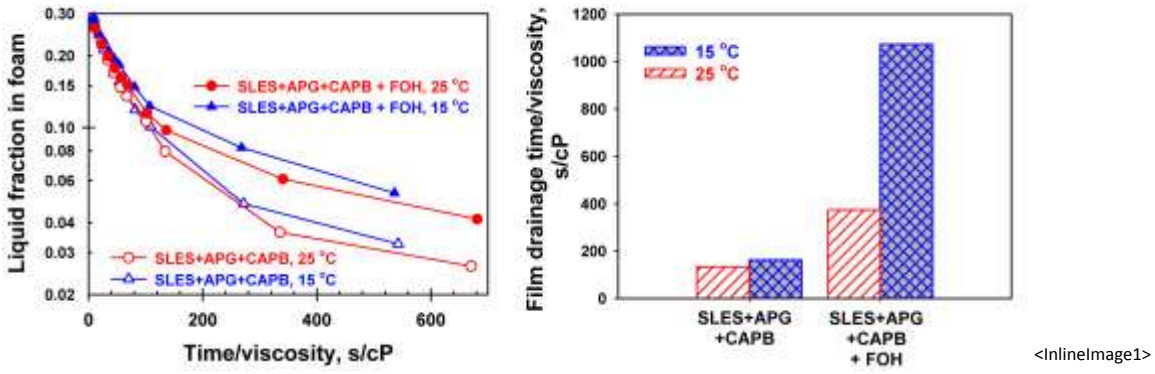
* Corresponding author: Tel. +359-2-8161612; *E-mail address*: km@lcpe.uni-sofia.bg

Highlights:

- - Stable foams were obtained by a triple surfactant mixture of APG, SLES and CAPB
- - Chelating agent MGDA helped the solubility of additives even in very hard water
- - Foam drainage was slowed by additives for high pH: fatty alcohol and modified starch
- - Temperature decrease further slowed down the drainage of foam and thin films
- - Temperature control on surface rheology was shown

Graphical

abstract



<InlineImage1>

Abstract:

We form and investigate foams stabilized by a triple surfactant mixture containing a nonionic alkyl polyglucoside (APG) in addition to the combination of ionic sodium lauryl-dioxyethylene sulphate (SLES) and zwitterionic cocamidopropyl betaine (CAPB) surfactants. APG improves the surfactants compatibility at alkaline pH. The addition of a readily biodegradable chelating agent methylglycinediacetic acid (MGDA) in the mixture contributes further for the excellent performance even in very hard water.

Foam properties are analyzed and compared to those of the single components and to the binary mixture without APG. Foam drainage is successfully controlled by introducing additives suitable for the alkaline conditions: fatty alcohol and/or hydrophobically modified starch.

Systematic model experiments are performed to characterize the surface tension and dilatational rheology, and thin films drainage. Slowed foam and thin films drainage is confirmed to correlate with the increased surface visco-elasticity in the presence of fatty alcohols. Temperature impact on the surface properties is used for fine tuning of the foam drainage.