Investigation of foam stability of aqueous solutions of 12-hydroxy-stearic acid

1 The sum frequency generation method

Sum frequency generation spectroscopy is an non-linear optical spectroscopic technique allowing for investigations of interfaces between isotropic media. Therefore a tunable IR ps-pulse and a visible pulse of fixed frequency are overlapped both temporally and spatially at the interface to be investigated in order to generate a signal at the sum frequency. The method yields a surface specific IR vibrational spectrum. Furthermore this method allows to access information

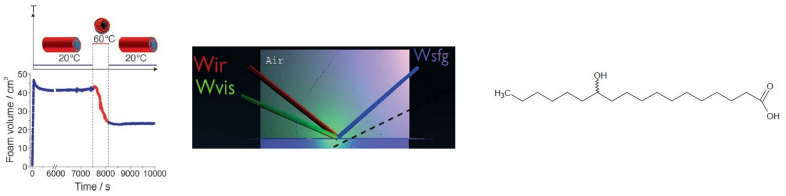

Figure 1: Schematic of the SFG experiment: a VIS and an IR pulse are spatially and temporally overlapped

on the average orientation of the molecules within the interfacial layer, where the sum frequency generation signal originates.

2 Foam stability of aqueous solutions of 12-hydroxy stearic acid

!2-hydroxy stearic acid is a non-natural derivative of the corresponding fatty acid. In high concentration regimes extremely high foam stability can be observed. Furthermore the foams are referred to as „smart foams“ as its stability can be switched from highly stable to rather unstable depending on the temperature. However a decent amount of solubility enhancing additives such as amino-ethanol are required in order to create aqueous solutions of sufficiently high concentrations. It is the aim of this study to clarify the impact of amino-ethanol on the reported[1] foam properties. Additionally we seek to identify the impact of the additional hydroxy-group on the system properties as compared to the naturally appearing stearic acid.

3 Contact

Hubert.Motschmann@chemie.uni-regensburg.de,
Matthias.Hofmann@chemie.uni-regensburg.de, starting from mid December 2014

References

[1] A.-L. Fameau, A. Saint-Jalmes, F. Cousin, B. H. Houssou, F. Boue, B. Novales, L. Navailles, F. Nallet, C. Gaillard, and J.-P. Douliez, “Smart foams: switching reversibly between ultrastable and unstable foams.,” *arXiv.org, e-Print Archive, Condensed Matter*, pp. 1–6, arXiv:1210.5696v1 [cond–mat.soft]–, 2012.