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Aqueous foams stabilized by PNIPAM microgels: A SANS study

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Probing the internal structure of macroscopic liquid foams, like their film thickness, is very difficult or even impossible with optical methods, since foams strongly scatter light in the visible range. To overcome this problem, small angle neutron scattering (SANS) can be used, as already demonstrated by Axelos et al. [1].

This contribution addresses foams stabilized by Poly-N isopropylacrylamide (PNIPAM) microgels. These foams are very stable at temperatures below the VPTT and can be destabilized on demand by increasing the temperature. The internal structure of these is investigated with SANS experiments, which allows for the thickness determination of foam films inside the foam.

Four microgels with varying cross-linker concentration were used to study the influence of particle stiffness on the foam film thickness. Furthermore, each foam was probed at three different heights inside of the foaming column, which corresponds to different times after the foam formation, to probe the evolution of film thickness over time.

These findings, combined with the knowledge about the mechanical properties of individual microgels, are used to explain the macroscopic foam properties, namely foamability and foam stability.

[1] M. Axelos and F. Boué, *Langmuir*, **2003**, 6598.

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