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Electronic Supporting Information (ESI)

Formulation and Polymerization of foamed 1,4-BDDMA-in-Water Emulsions

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S1 Optical Microscopy

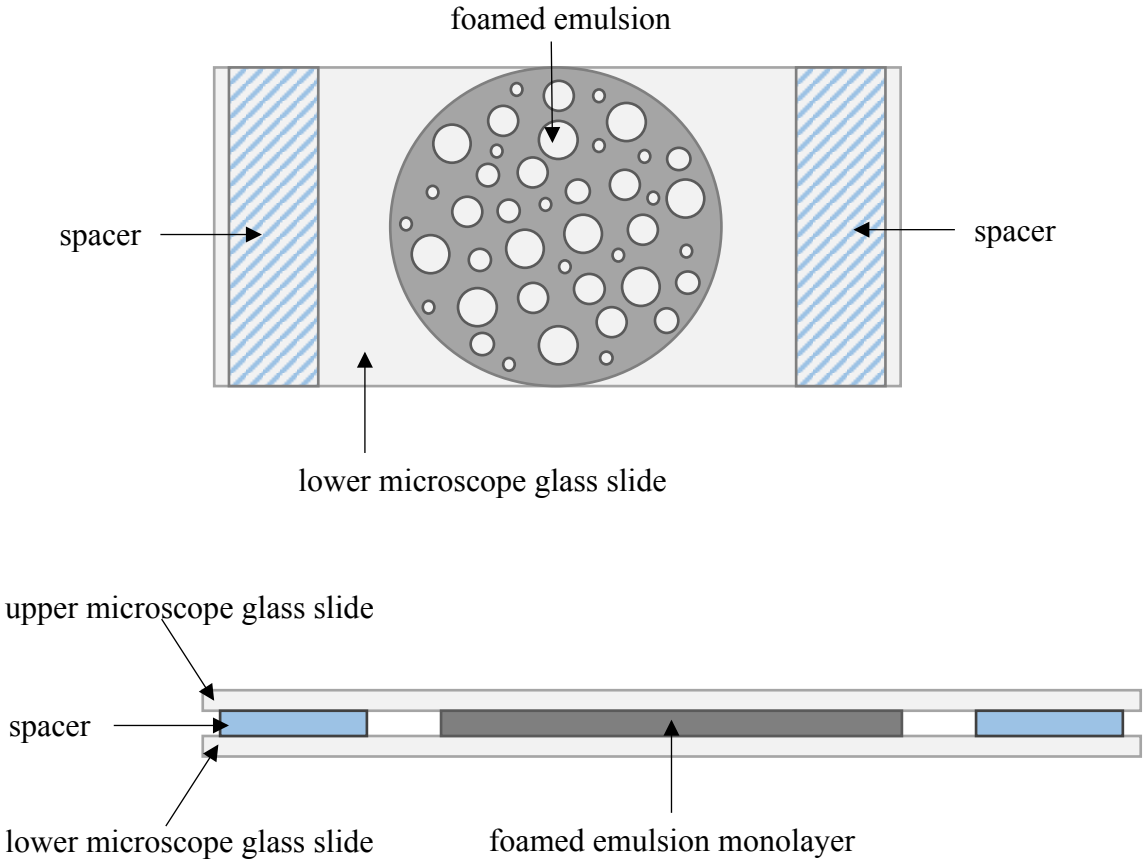

Figure S1: (Schematical) drawing of the top view (top) and side view (bottom) of the double-glass slide setup used for optical light microscopy. The lower microscope glass slide is equipped with a layer of adhesive tape as spacers at each end of the slide. The foamed emulsion is placed between the two spacers. A second microscope slide is put on top of first slide to confine the foamed emulsion in-between both slides. The thickness of the adhesive governs the thickness of the slit between both slides and thus the height of the foamed emulsion column.

For taking a micrograph of the foamed emulsion monolayers in Sections 3.1.1, 3.1.2 the adhesive tapes used had a thickness of 52 µm and were placed on the microscope glass slide as shown in Figure S1. For the data presented in Section 3.1.3, 3.1.4, 3.2 this spacer was replaced by an adhesive tape with a thickness of 55 µm and the arrangement of the tapes was slightly changed.

S2 Formulation of 1,4-BDDMA-in-Water Emulsions

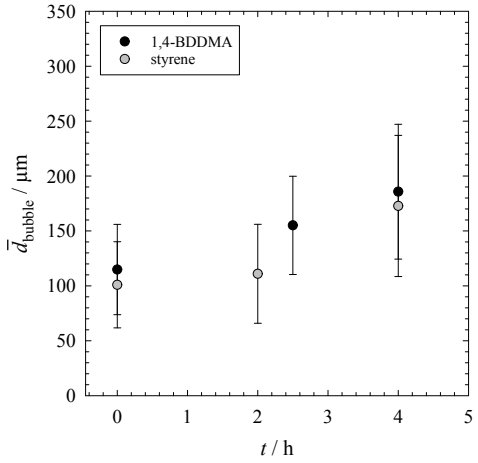

Figure S2.1: Mean bubble diameters of foamed 1,4-BDDMA-in-water emulsions (black circles) and of foamed styrene-in-water emulsions (gray circles). The continuous phase of the foamed emulsions consisted of 65 vol % monomer, 20 vol % water, and 15 vol % glycerol and was stabilized by 5 wt % SDS (calculated with respect to the total mass of the continuous phase of the foamed emulsion). The dispersed phase was air. The emulsions were foamed with a stirring speed of 1600 rpm for a stirring time of 4 min. For the calculation of the mean bubble diameters 100 bubbles were taken into account (n_{total} = 100).

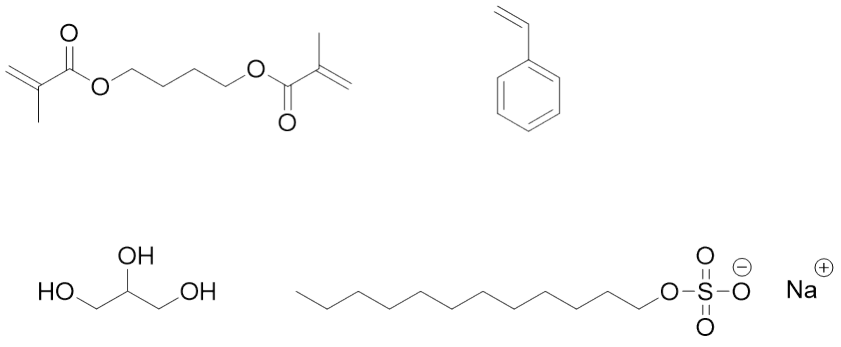

Figure S2.2: Molecular structures of 1,4-BDDMA (top left), styrene (top right), glycerol (bottom left) and SDS (bottom right).

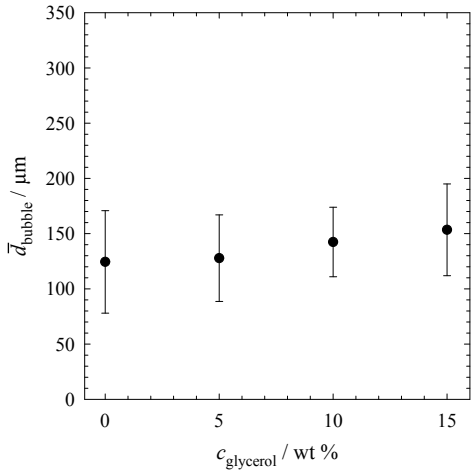

Figure S2.3: Mean bubble diameters of foamed 1,4-BDDMA-in-water emulsions with different water-to-glycerol ratios, namely 35:0, 30:5, 25:10 and 20:15 (plotted as a function of increasing glycerol content). The residual continuous phase of the foamed emulsion contained 65 vol % 1,4-BDDMA and was stabilized by 5 wt % SDS (calculated with respect to the total mass of the continuous phase of the foamed emulsion). The dispersed phase was air. All emulsions were foamed with a stirring speed of 1600 rpm for a stirring time of 4 min. For the calculation of the mean bubble diameters 100 bubbles were taken (n_{total} = 100).

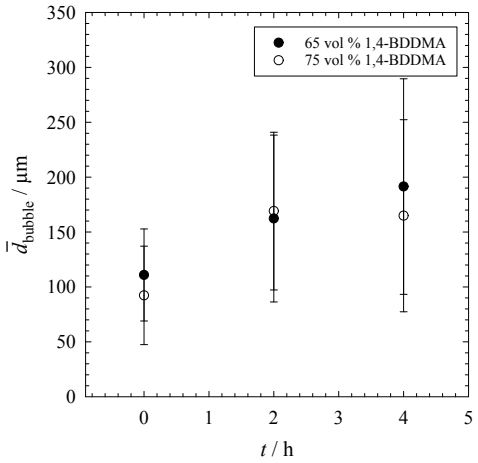

Figure S2.4: Mean bubble diameters of foamed 1,4-BDDMA-in-water emulsions consisting of 65 vol % 1,4-BDDMA, 30 vol % water, and 5 vol % glycerol (black circles) and 75 vol % 1,4-BDDMA, 20 vol % water, and 5 vol % glycerol (gray circles). The foamed emulsions were stabilized by 5 wt % SDS. (calculated with respect to the total mass of the continuous phase of the foamed emulsion). In case of foamed emulsions containing 75 vol % 1,4-BDDMA, 2 mol % BPO was dissolved in the continuous phase. The dispersed phase was air. The emulsions were foamed with a stirring speed of 1600 rpm for a stirring time of 4 min. For the calculation of the mean bubble diameters 100 bubbles were taken (n_{total} = 100).

S3 Foaming of 1,4-BDDMA-in-Water Emulsions

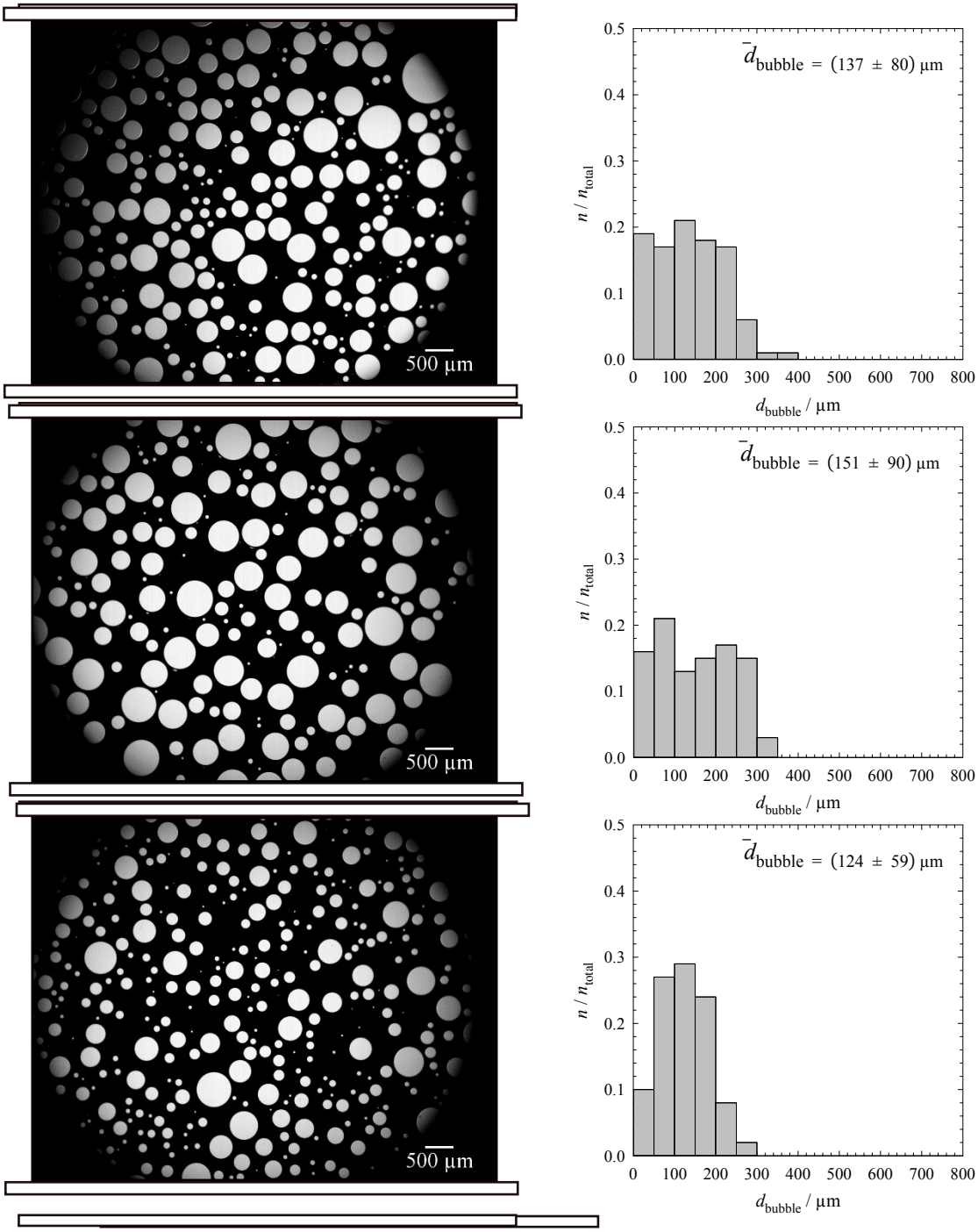

Figure S.3.1: Microscope pictures of monolayers of foamed 1,4-BDDMA-in-water emulsions consisting of 65 vol % 1,4-BDDMA, 30 vol % water, and 5 vol % glycerol. The continuous phase contained 5 wt % SDS (calculated with respect to the total mass of the continuous phase) and 2 mol % BPO (calculated with respect to the amount of the 1,4-BDDMA). The dispersed phase was air. The emulsions were foamed with a stirring speed of 1600 rpm for 2 min (top left), 4 min (middle left) and 8 min (bottom left). The microscope pictures were taken directly after foaming. The corresponding bubble size distributions with $n_{\text{total}} = 100$ are shown on the right. The microscope pictures are made with 4x magnifications.

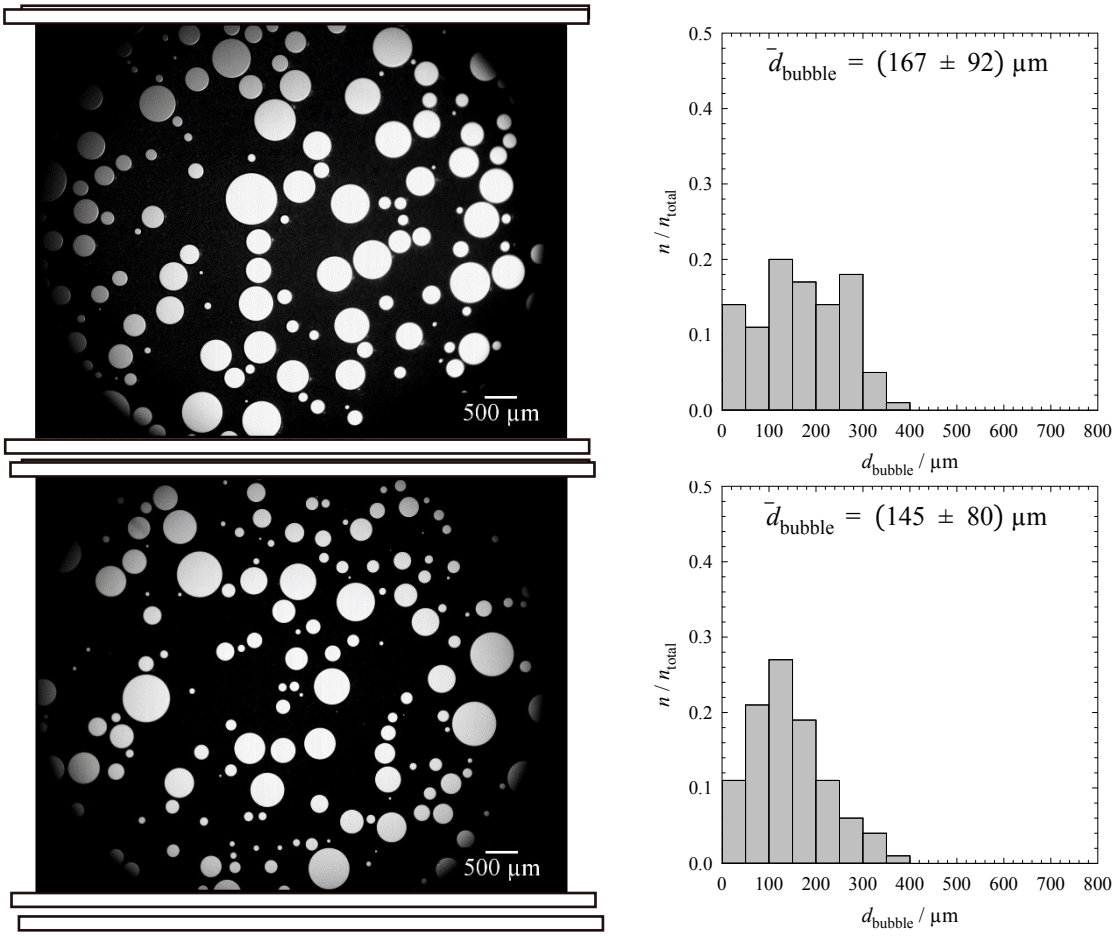

Figure S.3.2: Microscope pictures of monolayers of foamed 1,4-BDDMA-in-water emulsions consisting of 65 vol % 1,4-BDDMA, 30 vol % water, and 5 vol % glycerol. The continuous phase contained 5 wt % SDS (calculated with respect to the total mass of the continuous phase) and 2 mol % BPO (calculated with respect to the amount of the 1,4-BDDMA). The dispersed phase was air. The emulsions were foamed with a stirring speed of 1200 rpm for 4 min (top left) and 8 min (bottom left). The microscope pictures were taken directly after foaming. The corresponding bubble size distributions with n_{total} = 100 are shown on the right. The microscope pictures are made with 4x magnifications.