A. Emulsion viscosities

Emulsion viscosities η have been measured for different oil fractions ϕ and different shear rates $\dot{\gamma}$ using a Couette rheometer (PHYSICA MCR 300, Anton Paar) .The results are shown on the *Figure S1*.

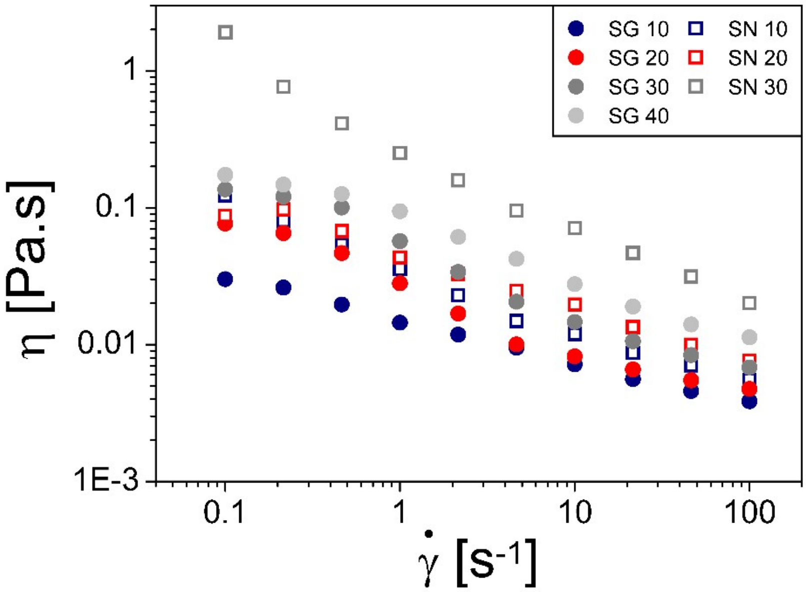

Figure S1 *Emulsion viscosity η as a function of shear rate $\dot{\gamma}$ for* ***(a)*** *Emulsions made using the double syringe technique (SG, colored circles ●).* ***(b)*** *Sonication (SN, colored open squares □). Points with the same color correspond to emulsions made with the same oil fraction. Names of samples refer to the generation technique followed by the oil volume fraction in the continuous phase.*

On Figure S1, we can see the emulsion viscosities as a function of shear rate $\dot{\gamma}$ for different emulsions. Viscosities decrease with $\dot{\gamma}$, the emulsions are shear-thinning. This means that during drainage as the drainage velocity and Plateau border size change leading to a change in the shear rate, the viscosity of the emulsion evolves. One can note that SN emulsions (small drops) are always more viscous than SG emulsions (bigger drops) and increasing the oil fraction increases the viscosity.

B. Measuring oil fraction

In order to verify that our measuring method combining image analysis and conductivity is accurate, we have measured ϕ independently. We have centrifuged the foamulsions in order to remove the air and to separate oil and water. After centrifugation at 10 000 rpm for 10 minutes, the emulsion separates into water at the bottom and a concentrated emulsion at the top. Indeed, we are unable to induce coalescence of oil drops during centrifugation. We estimate the oil fraction between 0.64 (jammed drops) and 1 (coalesced drops). The oil fractions calculated from the ratio of water and concentrated emulsion volumes are shown in *Figure S2*. The red triangles are for fully coalesced emulsions ($\phi = 1$) and blue triangles for jammed spherical drops ($\phi = 0.64$).

These data from conductivity measurements are also shown in *Figure S2* (empty circles). They fall in between the calculated oil fractions for the extreme cases, meaning that the drops are partially distorted in the concentrated emulsion or that some coalescence has occurred, or both.

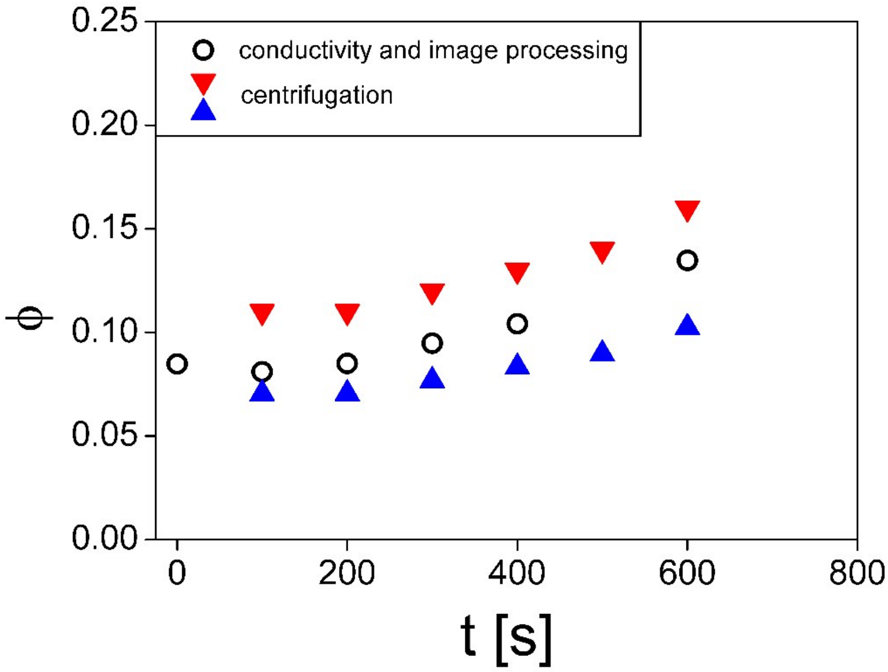

Figure S2 *Measured oil fraction in the emulsion versus foamulsion ageing time using electrical conductivity (black circles* **o***) and centrifugation (red and blue triangles). Red triangles (▼) are the maximum values of the oil fraction and blue triangles (▲) are the minimum boundaries (jammed spherical oil drops).*

These results suggest that our method is accurate and shows that as the foam ages, ϕ increases (see *Figures 4 and 5* of the main text).

C. Coarsening

Figure S3 (a) presents the evolution of the average bubble radius R normalized by the radius at time $t = 0$. For the two sets of emulsions and for different initial oil fractions. *Figure S3 (b)* shows the results for a foamed emulsion containing 20 % of oil in the continuous phase and with an initial volume fraction of 0.15 at different heights. The data are plotted in log-log scale, to highlight that $R(t)$ evolves as $t^{1/2}$ as expected when coarsening is controlled by gas diffusion.

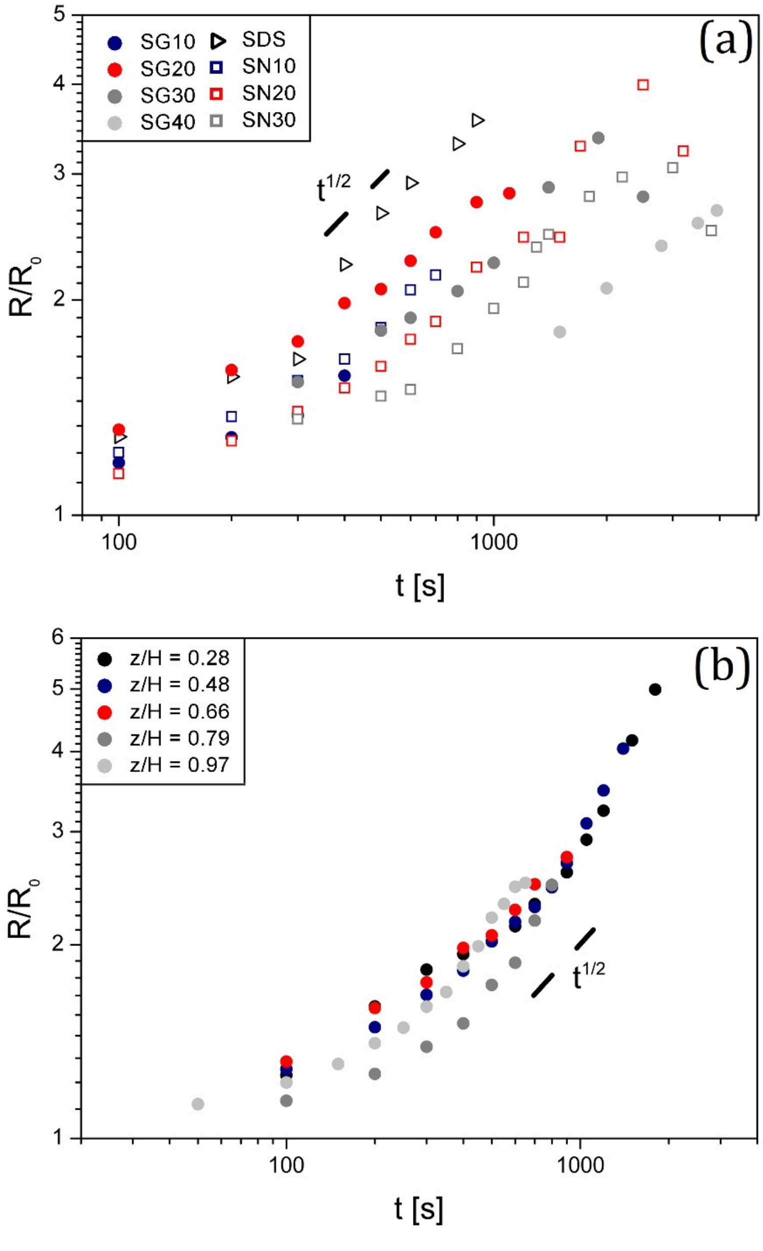

Figure S3 (a) *Evolution in time of average bubble radius normalized by initial value for SN (□) and SG (●) foamed emulsions with initial oil fractions from 0 to 0.40.* ***(b)*** *Normalized average bubble radius as a function of time for a SG20 foamed emulsion at different heights in the column, 1 being the top most position in the column.*

D. Confinement parameter λ

Figure S4 presents the evolution over time of the confinement parameter λ, ratio of the hydrodynamic radius (cluster size) and Plateau border radius. In Figure S4 (a) the temporal evolution of λ is depicted for the different types of emulsions studied and in Figure S4 (b) at different heights in the foam for one emulsion (SG20 with 20% oil in the continuous phase). λ is greater than from the onset of measurements, yet the drops are blocked, suggesting that the clusters do not behave as hard spheres. They are likely somewhat distorted when they flow through the foam channels.

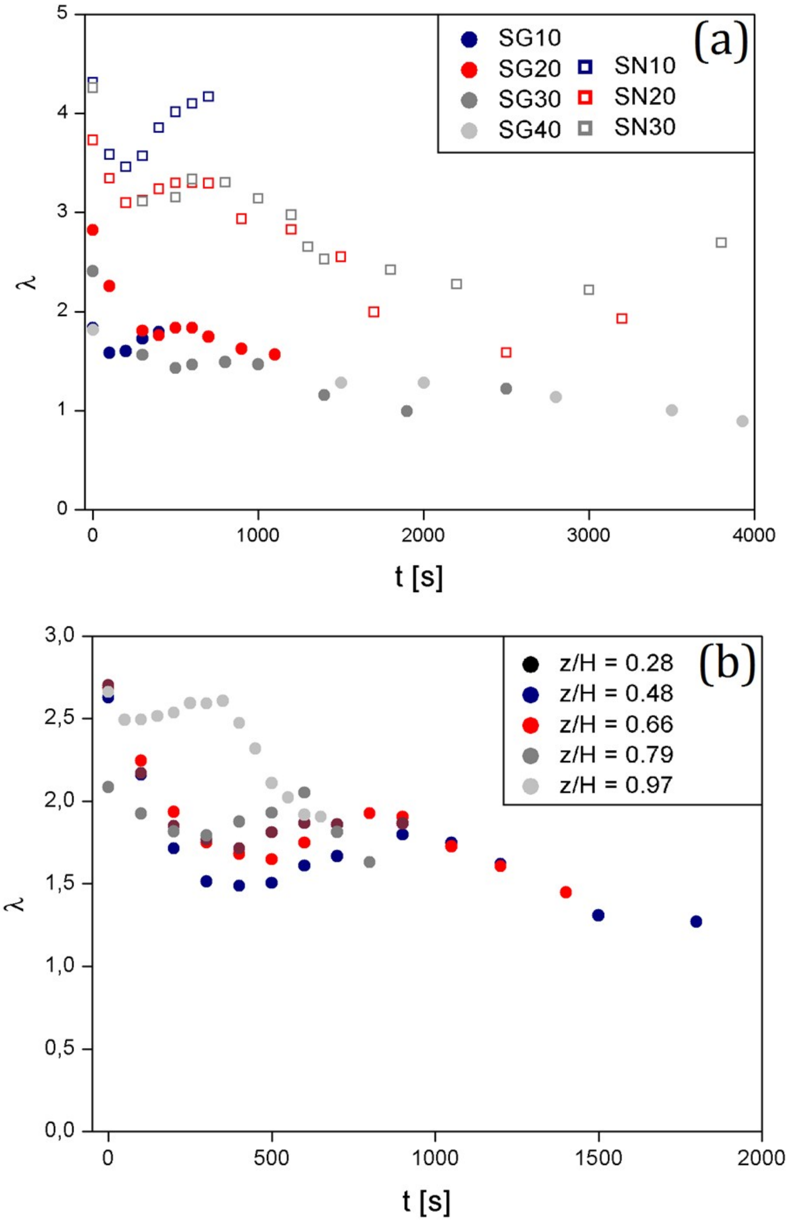

Figure S4 (a) *Evolution in time of confinement parameter λ for SN (□) and SG (●) foamed emulsions with initial oil fractions from 0 to 0.40.* ***(b)*** *Confinement parameter λ which is the ratio between oil drop aggregates and average Plateau border sizes, for SG20 foamed emulsion at different heights in the column as a function of time.*