Electronic Supplementary Material (ESI) for Soft Matter.

Cite this: DOI: 00.0000/xxxxxxxxxx

Stability of Big Surface Bubbles: Impact of Evaporation and Bubbles Size†

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Supplementary Information

Comparison between the model with convection and evaporation

Our main result is that a good description of the data necessitates to take into account an evaporation driven by the convection for RH = 20 and 50 % and by diffusion in a saturated environment.

To make our point, we plotted in Figure 1 the same data than in Figure 8 using different values for $\tau_{\rm film}$, which is calculated with equation 9 for RH = 20 and 50 % and with equation 8 for RH =100 %. The scaling is much less convincing than in Figure 8, which shows that our description of evaporation catches better the main physical mechanisms.

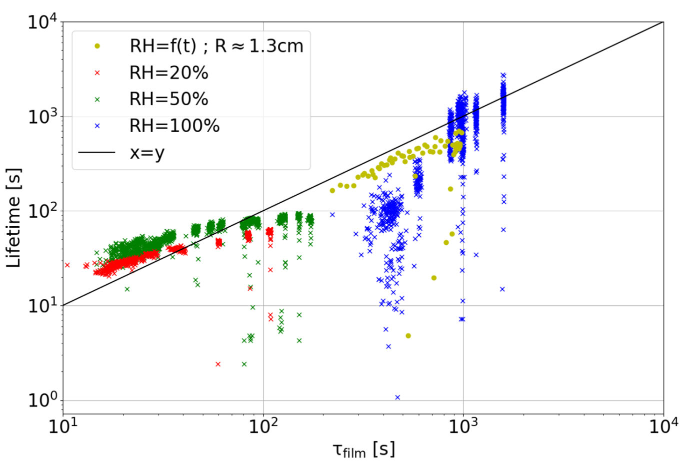

Fig. 1 The data plotted in the figure are the same than in Figure 8. $\tau_{\rm film}$ is now calculated in presence of a diffusive evaporation for smaller RH and in presence of a convective one for RH = 100 %.

Importance of the gravity driven drainage in the lifetime prediction

We showed that the drainage curves are better described if the gravity drainage is taken into account. In Figure 2, we plotted the quantity $\frac{\tau_{\rm cap}-\tau_{\rm film}}{\tau_{\rm film}}$, where $\tau_{\rm cap}$ is given by Equation 11 and $\tau_{\rm film}$ is calculated as explained in section 3.4, versus the bubble radius for all our measurements. The result is that Equation 11 overestimates the lifetime by 5-10 %. As expected, the overestimation grows with the bubble size.

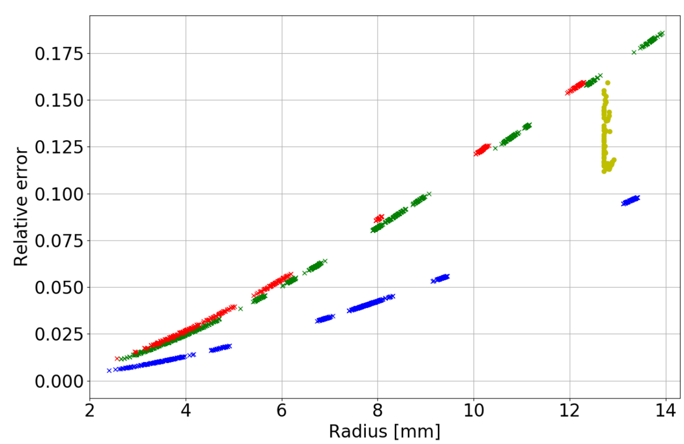

Fig. 2 The relative error made when the lifetime is calculated with Equation 11, *i.e.* without gravity driven drainage, is evaluated by $\frac{\tau_{\rm cap}-\tau_{\rm film}}{\tau_{\rm film}}$ and plotted versus the bubble radius for every experiment.