

Abstract Submitted
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Shape oscillations of attached bubbles in pure liquids and in surfactant solutions¹ JIRI VEJRAZKA, LUCIE VOBECKA, NICOLAS MEUNIER, MARIA ZEDNIKOVA, SANDRA ORVALHO, JAROSLAV TIHON, Academy of Sciences of the Czech Republic — The high-speed imaging is used for studying oscillations of air bubble, which are excited by a motion of a tip of a capillary, to which the bubble is attached. The frequency, damping and shape of decaying oscillations are determined for the lowest three eigenmodes. In pure water, the experimental results agree well with an inviscid analysis of Bostwick and Steen (*Phys Fluids* **21**, 2009), if the bubble size is small compared to the detachment size. For larger bubbles, the effect of neck formation on the oscillations is documented experimentally. The addition of a surfactant to the system modifies both the oscillation frequency and damping. The frequency initially increases with the increasing surfactant concentration due to Gibbs elasticity, and starts to decrease only after exceeding some surfactant concentration. The damping strongly increases, passes through a maximum and then slightly decreases. The maximum damping is observed for the concentration, at which the oscillation frequency starts to decrease. Concluding, bubble oscillations are strongly sensitive to presence of a surfactant.

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