

Abstract Submitted
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Gas dissolution in antibubble dynamics¹ BENOIT SCHEID, Université Libre de Bruxelles, JAN ZAWALA, Polish Academy of Sciences, STÉPHANE DORBOLO, Université de Liège — Antibubbles are ephemeral objects. Their lifetime is driven by the slow drainage of the air shell from the bottom to the top of the antibubble under the action of the hydrostatic pressure. We show in this work that this argument is only valid if the water used to make the surfactant mixture is saturated in air. Otherwise, two paths are used by the air that conducts to the thinning and the eventual collapse of the air shell: the drainage from the bottom to the top of the antibubble and the dissolution of the air by the liquid. Using degassed water dramatically shortens the lifetime of the antibubbles, as observed experimentally and rationalised by time-dependent simulations. Consequently, the antibubble lifetime is not only correlated to physical and chemical properties of the air-liquid interface but also to the gas content of the liquid. We also show that pure gas dissolution does not depend on the antibubble radius, a behaviour that allows to rationalise unexplained experimental data found in the literature.

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