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Lifetime of surface nanodroplets and surface nanobubbles XUEHUA ZHANG, RMIT, Melbourne, DETLEF LOHSE, University of Twente — Surface nanodroplets are nanoscopic emulsion droplets (e.g. of oil) on (hydrophobic) substrates immersed in water. Correspondingly, surface nanobubbles are nanoscopic gaseous domains on water-immersed substrates. Both can form through local oversaturation of the water with oil or gas, respectively. Such local oversaturation can be achieved through solvent exchange. Here we study the lifetime of such surface nanodroplets and nanobubbles in clean and degassed water, showing how both dissolve over time. We highlight pinning effect which considerably extend the lifetime of both surface nanodroplets and nanobubbles and reveal stick-slip motion of the three phase contact line during the dissolution process. We also discuss collective effects which extend the lifetime too.

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