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**Collapse of Surface Nanobubbles** LONGQUAN CHEN, CHON U CHAN, MANISH ARORA, CLAUS-DIETER OHL, School of Physical and Mathematical Science, Nanyang Technological University — Surface nanobubbles are nanoscopic gaseous domains that entrap on immersed solid surfaces in water. They are surprisingly stable and are difficult to be distinguished from polymeric/hydrophobic drops and solid particles (contamination). Here, we report a comparative study of contact line motion across surface nanobubbles, polymeric drops and solid particles. We show that surface nanobubbles spontaneously collapse once contact line touches them while a fast jump process and a pinning process are observed on polymeric drops and on solid particles, respectively. These distinct contact line dynamics provide a new approach to identify surface nanobubbles. The collapse of surface nanobubbles demonstrates their gaseous property and also indicates that they are metastable. The collapse process last few milliseconds with a characteristic speed of 0.1 mm/s, which is much longer and slower than that of hydrodynamic phenomena. We further show that the collapse phenomenon can be explained with a microscopic contact line dynamics.

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