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Lateral Spreading of Gas Bubbles on Submerged Horizontal Wettability-confined Tracks MOHAMAD JAFARI GUKEH, TAMAL ROY, UDDALOK SEN[1], Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, Illinois 60607, United States, RANJAN GANGULY, Department of Power Engineering, Jadavpur University, Kolkata 700106, India, CONSTANTINE MEGARIDIS, Department of Mechanical and Industrial Engineering, University of Illinois at Chicago, Chicago, Illinois 60607, United States — While the spreading of liquid droplets on wettability-confined paths has been widely studied in the past decade, a quantitative study of the inverse scenario of a gas bubble spreading on a submerged, wettability-confined track has rarely been investigated in the scientific literature. In the present study, an experimental investigation of the spreading of millimetric gas bubbles on horizontally-submerged, textured, wettability-confined straight tracks is carried out. After gently dispensing a bubble at one end of the track, the spreading dynamics of the gas bubble is studied. The effects of varying bubble diameter, track width, and ambient liquid properties are investigated. After contact, the gas bubble spreads laterally with a constant velocity of $O(0.5$ m/s), while remaining pinned at the starting point. The experimentally-observed spreading dynamics is described accurately by an inertio-capillary force balance.

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