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The role of contact angle on sloshing and air entrainment in a confined domain ZHONGWANG DOU, JAVAD ESHRAGHI, AREZOO ARDEKANI, PAVLOS VLACHOS, Purdue University — Sloshing in a confined domain exists in many engineering applications, and the dynamic changes of the interfacial area and air entrainment due to sloshing may result in undesired consequences. We study the sloshing dynamics and air entrainment in an enclosed, vertically positioned glass tube, with and without silicone surface coating. We introduce a sudden acceleration and deceleration to the tube along its axial direction by impacting the top of the container using a spring-preloaded rod. The height of airgap, the viscosity of the liquid, and the magnitude of acceleration/deceleration are varied. Interface deformation and breakup due to the intense movement are captured using a high-speed camera. The resulting air entrainment, which is characterized by the bubble size distribution, is obtained using an in-house developed edge recognition algorithm. The dynamics changes of the interfacial area and the degree of air entrainment at different test conditions are reported and compared, and the role of the surface coating and contact angle is analyzed.

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