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A single bubble path transition from spiral to zigzag in dilute surfactant solution¹ YOSHIYUKI TAGAWA, WATARU KAWAGUCHI, AMI FUNAKUBO, SHU TAKAGI, YOICHIRO MATSUMOTO, The University of Tokyo, FLUID ENGINEERING LAB TEAM — The surfactant effect on a single bubble motion is so important that it changes whole bubbly flow structures. One of the surfactant key effects is to decrease bubble rise velocity. This phenomenon is described as Marangoni effect which is quantitatively investigated by many experiments and numerical calculations of straight rising bubbles. Some other previous researches studied a bubble trajectory transition from a zigzag trajectory to spiral in super purified water (Mougin et al. 2002). However, the surfactant effect on this 3D motion bubbles is not enough investigated. To investigate it in detail, we measured trajectories of single bubbles rising in a tank of 1300mm height filled with dilute surfactant solution. We observed a bubble motion transition from spiral to zigzag, which is just reverse transition of trajectories in super purified water. Considering our other measurement results of bubble trajectories in super purified water, those in different surfactant solution, and a profile of bubble rise velocity, we think this interesting result is explained by surfactant concentration on a bubble surface. We will discuss its mechanism in detail in our presentation.

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