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Change of *Re* dependency of single bubble 3D motion by surface slip condition in surfactant solution[1] YOSHIYUKI TAGAWA, AMI FUNAKUBO, SHU TAKAGI, YOICHIRO MATSUMOTO, The Univ. of Tokyo, THE UNIV. OF TOKYO TEAM — Path instability of single bubble in water is sensitive to surfactant. One of the key effects of surfactant is to decrease bubble rising velocity (i.e. increase drag) and change bubble slip condition from free-slip to no-slip. This phenomenon is described as Marangoni effect. However, the surfactant effect to path instability is not fully investigated. In this research, we measured bubble 3D trajectories and velocity in dilute surfactant solution to reveal the relation between 3D motion mode and slip condition. Experimental parameters are types of surfactants, concentrations and bubble sizes. Bubble motions categorized as straight, spiral or zigzag are plotted on two-dimensional field of bubble Reynolds number Re and normalized drag coefficient C_D^* which is strongly related to surface slip condition. Range of Re is from 200 to 1000 and C_D^* is from 0 to 1. Our results show that when C_D^* equals 0 or 1 (free-slip condition or no-slip condition, respectively), bubble motion mode is changed by Re. However when C_D^* is 0.5, bubble motion is always spiral. It means that Re dependency of bubble motions is strongly affected by slip condition. We will discuss its mechanism in detail in our presentation.

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