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Effects of microbubbles on Taylor-Couette flow YUJI TASAKA, YUICHI MURAI, TOMOAKI WATAMURA, YASUSHI TAKEDA, Hokkaido University — Effects of micro-bubbles on Taylor-Couette flow has been examined by means of ultrasonic velocity profiling (UVP) for wide range of the Reynolds number, $1 \leq Re/Re_c \leq 18$, where Re_c is the critical Reynolds number for the onset of the primary instability. $O(10\mu m)$-diameter hydrogen bubbles generated by electrolysis of water was dispersed into the fluid layer of water between the vertical, co-axial cylinders. The radius ratio of the cylinders and the aspect ratio are 0.905 and 20, the maximum void fraction estimated by input power for the electrolysis is smaller than 0.1 %. Different flow pattern of the rising bubbles are observed in the spatio-temporal velocity distribution measured by UVP; i.e. free rising and snake-like rising. Axial wavelength of the Taylor vortices show no clear influence of bubbles, but the frequency of the azimuthal traveling wave is reduced by bubbles. Since the number of the traveling waves on the azimuthal plane is the same in the conditions, single phase and with bubbles, the reduction of the frequency means the reduction of the traveling velocity of the wave. Facts to change the traveling velocity, the aspect ratio, the radius ratio, the axial wavelength of the vortices and the number of waves, are no difference on the both cases, therefore, we guess the decrease of the shear rate of the fluid due to micro-bubbles induces this reduction of the traveling speed.

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