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A relation between the structures of a void fraction and liquid motion and the dissolved CO2 gas concentration, in a bubbly flow MASAHIRO YAMADA, Graduate School Engineering, Shizuoka University, TAKAYUKI SAITO, Graduate School of Science and Technology, Shizuoka University — We discuss a relation between the structures of a void fraction and liquid motion and the CO_2 concentration, using a newly developed photoelectric optical fiber probe (POFP). The POFP is able to simultaneously measure a bubble diameter, velocity, time-series void fraction, and CO_2 concentration dissolved in the liquid around the bubbles. Moreover, we measured the velocity of the liquid phase at the same point, using LDV. We adopted a similar way of thinking into a consideration of the length scale to the liquid phase motions, void fraction and CO_2 concentration in order to evaluate spatial-scale. The integral-length-like scale of the liquid phase motions indicated few change against the height. The length scale of the void fraction became small toward the upper zone of the bubble column. On the other hand, the length scale of the CO_2 concentration exists up to the height of the middle zone. Based on these results, we discuss a relation of spatial-scale of the void fraction and the liquid motion to the CO_2 concentration.

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