Development of fine bubble generator by active control of pressure in gas chamber

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Abstract

Fine bubble attracts keen attention and the application is spreading in various fields. Fine bubble is classified into two types of bubbles depending on the size. The larger one is microbubble which is larger than one micrometer and the other is ultrafine bubble which is smaller than one micrometer. Fine bubble is known to promote bacteria culture by increasing the dissolution rate of gas into liquid and to improve washing of solid matters by absorbing dirt materials on gas-liquid interface whose area is extremely large.

Various types of fine bubble generators have been developed upon the requirement of desired bubble size, bubble density at a constant temperature without contamination and of high scalablility without regarding liquid viscosity.

The present study suggests a novel type of generator of fine bubble with high uniformity in bubble size as well as the high bubble density. The key technique of this device is to apply fluidic oscillation inside the nozzle by positive control of pressure fluctuation in the gas chamber.

Bubble size distribution and bubble density were investigated by changing operating parameters. On a specific condition, monodispersed fine bubble with Sauter mean diameter of 84 μm and CV value of 8.5 % was obtained. On the basis of observed values, mechanism of generating fine bubbles in this device would be clarified and the way to enhance bubble density would be discussed.

Key words *: Fine Bubble, Fluidic oscillation, Chamber Pressure, Monodisperse*

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