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Evolution of Bubbles through Gas Injection from a Micro-Tube into Liquid Cross-Flow SINA GHAEMI, PAYAM RAHIMI, DAVID NOBES, University of Alberta — Generation of small-size bubbles is of importance in many processes such as chemical, medical and food industries. The most common method of bubble generation is injection of gas from an orifice into the liquid phase. In spite of simplicity of this method, appropriate conditions should exist to avoid bubble growth and obtain required small-size bubbles. Thorough understanding of the bubble formation and growth can reveal the required conditions and ensure detachment of the bubbles from the orifice with desired timing to control their size. In this work, evolution of bubbles from a micro-size gas injection tube into liquid cross-flow is investigated. Special attention has been devoted to optimize the conditions to generate micro-size bubbles. Specifically, the influence of gas injection tube size and location, gas and liquid Reynolds numbers and the geometry of the mixing chamber on the bubbles evolution is studied. High-speed shadowgraphy technique is applied to investigate bubbles size and shape. A Particle Tracking Velocimetry algorithm is also applied to calculate bubbles velocity. The velocity field of the liquid flow surrounding the bubbles is also characterized using a Mirco-Stereo-Particle Image Velocimetry technique.

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