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RESEARCH NOTES

应用激光成像系统研究非牛顿流体中的气泡生成

姜韶堃[a], 范文元[a], 朱春英[a], 马友光[a], 李怀志[b]

[a] State Key Laboratory of Chemical Engineering, School of Chemical Engineering and Technology, Tianjin Univer-sity, Tianjin 300072, China
[b] Laboratoire des Sciences du Génie Chimique, CNRS-ENSIC-INPL, 1, rue Grandville, BP 451, 54001 Nancy cedex, France

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摘要 A self-developed laser image measurement system was established to study the behavior of
bubble for-mation at a single orifice in non-Newtonian polyacrylamide (PAAm) solutions. Images of bubbles were captured by a CCD camera and volumes of bubbles were digitally analyzed online. The effects of rheological property of PAAm solution, orifice, reservoir, and gas flowrate on bubble formation were studied experimentally. It is found that the volume of bubble increases with the concentration of PAAm solution, the diameter of the orifice, and the gas flowrate, respectively, whereas little effect of reservoir is observed in experiments.

关键词 bubble formation laser non-Newtonian polyacrylamide
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Bubble formation in non-Newtonian fluids using laser image measurement system

JIANG Shaokun[a], FAN Wenyuan[a], ZHU Chunying[a], MA Youguang[a], LI Huaizhi[b]

[a] State Key Laboratory of Chemical Engineering, School of Chemical Engineering and Technology, Tianjin Univer-sity, Tianjin 300072, China
[b] Laboratoire des Sciences du Génie Chimique, CNRS-ENSIC-INPL, 1, rue Grandville, BP 451,
54001 Nancy cedex, France

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Abstract A self-developed laser image measurement system was established to study the behavior of bubble for-mation at a single orifice in non-Newtonian polyacrylamide (PAAm) solutions. Images of bubbles were captured by a CCD camera and volumes of bubbles were digitally analyzed online. The effects of rheological property of PAAm solution, orifice, reservoir, and gas flowrate on bubble formation were studied experimentally. It is found that the volume of bubble increases with the concentration of PAAm solution, the diameter of the orifice, and the gas flowrate, respectively, whereas little effect of reservoir is observed in experiments.

Key words bubble formation; laser; non-Newtonian; polyacrylamide

通讯作者:
姜韶堃 ygma@tju.edu.cn
作者个人主页: 姜韶堃[a]; 范文元[a]; 朱春英[a]; 马友光[a]; 李怀志[b]

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本文作者相关文章
· 姜韶堃a
· 范文元a
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