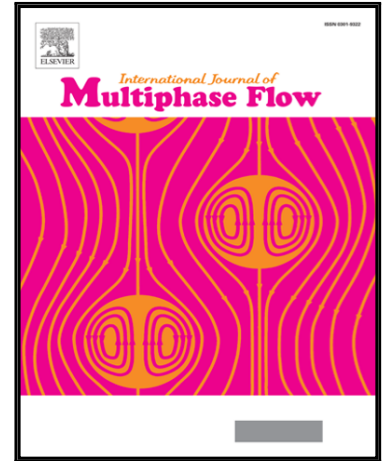


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A Kinetics-based universal model for single bubble growth and departure in nucleate pool boiling

Herman D. Haustein

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HIGHLIGHTS

- An analytical/empirical study dealing simultaneously with bubble growth and departure, due to their inherent coupling
- An extensive discussion of the most suitable form of heat transfer and drag coefficients for a bubble growing near a wall
- A 1D energy balance based bubble growth equation, modified according to kinetic theory – combining traditional macro approach with a micro-scale viewpoint
- Identification of the importance of the kinetic parameter, L/RT , and a new regime map based on it and on the Jakob number
- A new explanation to additional pressure dependence of bubble departure, and trend transition in bubble growth/departure at high pressures
- A new universal model based on very few empirical parameters and validated over a very wide range of data: 19 liquids/liquefied gases, from very low pressures up to near the critical point, sub millimeter to several centimeter bubbles and gravity levels

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