

Annie Steinchen (Ed.)

Dynamics of Multiphase Flows Across Interfaces



Springer

CONTENTS

PART I

Basic Constitutive Relations for Surfaces

Balance Equations for Fluid Curvilinear Media

R. Prud'homme 1

The Second Gradient Theory Applied to Interfaces:
Models of Continuum Mechanics for Fluid Interfaces

H. Gouin 8

Asymptotic Modelling of Fluid-Fluid Interfaces

R. Gatignol 14

Surface Excess Momentum Balances by Integration
Across the Surface of the Volume Balances

A. Sanfeld and A. Steinchen 28

Extended Irreversible Thermodynamics: Towards
a Non-Local Formulation

G. Lebon 37

Transient Surface Properties of Liquid Bridge and
Pendant Drop Menisci in Gravity and Low Gravity

J.F. Padday 41

PART II

1 - Fundamental Equations

Bénard-Marangoni Instability in a Rotating
Liquid Layer with a Deformable Free Surface

G. Lebon, P. Cerisier and O. Dupont 56

Balance Equations and the Problem of Constitutive
Relations in Varied Dimensions Curvilinear Media

R. Prud'homme 69

Some Preliminary Results About Equilibrium
Surface Model

F. Cuadros, A. Mulero and W. Okrasinski 80

2 - Surface Instabilities

Experimental Study of the Convective Phenomena
During the Evaporation of Aqueous Solutions of Sucrose

B. Simon 90

Experimental Study of the Competition Between Convective Rolls in an Enclosure <i>P. Cerisier and S. Rahal</i>	105
Surface Deflection in Bénard-Marangoni Convection <i>P. Cerisier and G. Lebon</i>	117
3 - Boiling	
Cooling of Small Electronic Devices by Boiling in Microgravity <i>J. Straub, J. Winter, G. Picker and M. Zell</i>	134
Modelling of Transient Boiling in Microgravity <i>K. Sefiane and A. Steinchen</i>	150
4 - Dynamic Surface Tension - Thermocapillarity	
Surface Dynamics of Surfactant Solutions <i>J.C. Earnshaw, E. McCoo, C. Nugent and D.J. Sharpe</i>	166
The Capillary Pressure Method: a New Tool for Interfacial Tension Measurements <i>L. Liggieri, F. Ravera, A. Passerone, A. Sanfeld and A. Steinchen</i>	175
Effects of Evaporation - Condensation on Thermocapillary Convection <i>G. Petre and A. Azouni</i>	186
5 - Surface Forces and Surfaces Under External Fields	
Behaviour of the Liquid Between a Solid Particle and an Approaching Crystallization Front: Forces Balance <i>P. Casses and A. Azouni</i>	193
Disintegration of Cylindrical Liquid Columns in Liquid-Fluid Systems Direct Numerical Simulation <i>M. Chacha, R. Occelli, L. Tadrist and S. Radev</i>	207
Microwave Heating as a Tool to Couple Marangoni and Hickman Instabilities <i>D. Stuerga, A. Steinchen-Sanfeld and M. Lallement</i>	227
Pool Boiling with an Imposed Electric Field: Main Results of a Theoretical and Experimental Research <i>W. Grassi, P. Di Marco, P. Carrica, R. Manetti, M. Grassi and G. Mazzoni</i>	240
Toward a Nonequilibrium Non-Linear Thermodynamics <i>M.G. Velarde</i>	253