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PREFACE TO
SECOND EDITION

Since the first edition was published in 1985, fundamental understanding of
interfacial phenomena has advanced significantly although more extensively in
some areas than in others. Interest in interfaces and surfactant behavior has
increased, and applications have multiplied. While we discuss some new appli-
cations in this expanded second edition, we have retained the chief objective of
the first edition: a concise summary of the fundamentals with emphasis on
equilibrium phenomena followed by chapters on flow, transport and stability of
interfaces understandable to graduate students and others entering the field but
also useful to researchers whose major focus is not on dynamic interfacial phe-
nomena. Some background in thermodynamics and transport phenomena is
assumed. Although all chapters of the first edition have been modi
fied, Chapters
IV on surfactants and VI on transport effects have undergone the greatest expan-
sion and increase in scope. Moreover, an entirely new Chapter VIII has been
added on mass transfer measurements and key experimental techniques for deter-
mination of microstructure in colloidal dispersions and surfactant systems. In all
chapters references have been updated and new problems added.

Major changes in individual chapters are as follows:
• Chapter I on interfacial tension. New section on solid-fluid interfaces.
• Chapter II on contact angles. New sections on acid-base interactions
  and characterization of solid surfaces.
• Chapter III on colloidal dispersions. Electrostatics follows S.I. units.
  New section on characterization of colloidal dispersions. Section on
  effects of adsorbed polymer completely rewritten with new material.
• Chapter IV on surfactants. New sections on surfactant/polymer inter-
  actions and on chemical reactions in micellar solutions and microemul-
  sions plus expansion and inclusion of new material in almost all other
  sections.
• Chapter V on interfacial stability. Section on thin liquid films and foam
  completely rewritten to incorporate recent developments.
• Chapter VI on transport effects on interfacial stability. New material
  on solubilization rates and formation of intermediate phases during
diffusion in surfactant systems; sections on spontaneous emulsification
  and dynamic surface tension revised and expanded.
• Chapter VII on interfacial dynamics. Sections on drainage of thin liquid films and on dynamic contact lines updated and expanded and new section on very thin films added.
• Chapter VIII on mass transfer and techniques for determining microstructure. New chapter on experimental techniques as indicated above including static and dynamic light scattering and NMR self-diffusion. Further discussion of mass transfer effects.

Clarence A. Miller
Partho Neogi
May, 2006
Authors

Clarence A. Miller is Louis Calder Professor of Chemical and Biomolecular Engineering at Rice University in Houston, Texas and a former chairman of the department. Before coming to Rice he served on the faculty at Carnegie-Mellon University from 1969-1981. He received B.A. and B.S. degrees from Rice University (1961) and the Ph.D. degree from the University of Minnesota (1969), all in chemical engineering. He has been a Visiting Scholar at Cambridge University, England (1979-80), University of Bayreuth, Germany (1989, 1995) and Delft University, the Netherlands (1995).

Dr. Miller’s research interests center on equilibrium and dynamic phenomena in oil/water/surfactant systems, specifically interfacial stability and behavior of emulsions, microemulsions and foams and their application in areas such as detergency, enhanced oil recovery and environmental remediation. He is a Fellow of the American Institute of Chemical Engineers and a member of the American Chemical Society, American Oil Chemists Society, International Association of Colloid and Interface Scientists, and the Society of Petroleum Engineers. He has published numerous research papers and review articles on interfacial phenomena, served on the editorial boards of leading journals in the field, and given invited lectures at conferences, universities and industrial laboratories in many countries.

Partho Neogi is a Professor of Chemical and Biological Engineering at the University of Missouri-Rolla. He received his B. Tech. (Hons.) at the Indian Institute of Technology Kharagpur (1973), M. Tech. at the Indian Institute of Technology Kanpur (1975) and his Ph. D. at Carnegie-Mellon University (1979), all in Chemical Engineering. He joined the University of Missouri-Rolla in 1980, and has been there since.

Dr. Neogi’s research area lies in studies of transport at interfaces. They include dynamics of wetting, surfactant systems and electrochemical systems. He has also contributed in thermodynamics and transport in surfactant systems and polymer membranes. He is member of the American Institute of Chemical Engineers and the American Chemical Society.