Besides the newly discovered drug candidates, modification formulations of existing drugs are also gaining importance. Significant numbers of commercial insoluble drugs with improved formulations that provide for faster dissolution and enhanced bioavailability were filed as New Drug Applications (NDA) under 505(b)(2), which is relatively profitable strategy for pharmaceutical companies.

Through decades of diligent and intelligent research by pharmaceutical scientists, many techniques dealing with the formulation issues of water-insoluble drugs have been developed and accumulated in the pharmaceutical literature. A book that systematically described the techniques used for water-insoluble drug formulations could be a real benefit to development scientists. This was the primary motivation that led to the publication of *Water-Insoluble Drug Formulations* in 2000 and the updated second edition with additional content in 2008. During the last decade, various insoluble drug delivery technologies, especially nanoparticle-based technologies, bloomed in both academic and industrial settings, and several platforms were successfully adopted by many pharmaceutical companies. These developments have led to this updated third edition of *Water-Insoluble Drug Formulations.*

The aim of this book is to provide a handy reference for pharmaceutical scientists in the handling of formulation issues related to water-insoluble drugs. In addition, this book may be useful to pharmacy and chemistry undergraduate students, and to pharmaceutical and biopharmaceutical graduate students, to enhance their knowledge in the techniques of drug solubilization and dissolution enhancement. This book covers topics ranging from solubility theories, solubility prediction models, the aspects of preformulation, biopharmaceutics, pharmacokinetics, regulatory, and discovery support of water-insoluble drugs to various techniques used in developing delivery systems for water-insoluble drugs. In general, each chapter describing a solubilizing system starts with the brief theoretical background associated with the particular system, followed by practical discussions of industrial experiences, and concluded by examples or case studies.

The chapter "Solubility Theories" provides a systematic review of existing theories regarding the interactions between solutes and solvents. The chapter "Prediction of Solubility" may be helpful to those drug discovery chemists and pharmaceutical scientists who work in the discovery support area to design new drug candidates with improved aqueous solubility before they are synthesized. The chapters "Preformulation Aspects of Water-Insoluble Compounds" and "Water-Insoluble Drugs and Their Pharmacokinetic Behaviors" can be used by a formulator (especially an inexperienced one) to understand the particulars of the physicochemical, biopharmaceutical, and pharmacokinetic properties of a water-insoluble drug. When dealing with lead compounds with poor *drug-like* properties in early formulations, pharmaceutical scientists can refer to the chapter "Formulation Strategies and Practice Used for Drug Candidates with Water-Insoluble Properties for Toxicology, Biology, and Pharmacology Studies in Discovery Support" to obtain different formulation approaches to support the animal studies in toxicology, pharmacology, and pharmacokinetics. The chapter "Regulatory Aspects of Dissolution for Low Solubility Drug Products" provides some very useful guidelines for dissolution from the Food and Drug Administration (FDA) perspective. Some preformulation and exploratory solubilization experiments, guided by these chapters, are usually necessary before the design of a water-insoluble drug formulation.

For water-insoluble drugs with high permeability or Class II drugs in FDA's Biopharmaceutics Classification System (BCS), drug absorption in the gastrointestinal (GI) tract is primarily limited by drug dissolution rate (Amidon et al., 1995; McGilveray, 1996; Yu et al., 2002; Pepsin et al., 2016). Therefore, the formulation work of oral solid dosage forms for Class II compounds should focus on the enhancement of dissolution rate. Dissolution rate enhancement and related techniques for the development of oral solid dosage forms can be found in the chapters "Alteration of the Solid State of the Drug Substance: Polymorphs, Solvates, and Amorphous Forms," "Development of Solid Dispersions for Poorly Water-Soluble Drugs," "Particle Size Reduction," "Pharmaceutical Powder Technology—ICH (the International Conference on Harmonisation) Q8 and Building the Pyramid of Knowledge," "Prodrugs for Improved Aqueous Solubility," "Pharmaceutical Salts," "Applications