

Separation Process Engineering: Includes Mass Transfer Analysis, 5th Edition

By Phillip C. Wankat
Pearson Education, Inc., New York, 2023, 1168 pages
ISBN -13:(print) 978-0137468041
Paperback: \$128

Reviewed by Allen Hersel
Trine University

Separation Process Engineering: Includes Mass Transfer Analysis, the fifth edition by Phillip C. Wankat, is a well written, comprehensive textbook that impressively articulates the principles and applications of separation processes in chemical engineering. The book encompasses a broad spectrum of separation processes. Unlike most separation texts, the book also explores the economic aspects of separation processes, discussing optimization techniques and cost analysis, which adds practical value to the book.

From the very beginning, the book lays the groundwork by providing a comprehensive overview of separation processes in chemical engineering. The opening chapter emphasizes the importance of these processes, introduces the concept of mass transfer and introduces the reader to different separation techniques. This comprehensive introduction prepares readers for its in-depth analysis and establishes a solid foundation, setting the stage for the subsequent chapters.

Throughout the book, the author maintains a systematic and structured approach, gradually guiding readers from fundamental concepts to more advanced topics. Each separation process is meticulously explored, especially distillation, which has numerous chapters dedicated to the subject. Two total chapters are dedicated to the analysis of adsorption and ion exchange, while the remaining techniques like extraction, crystallization, and membrane processes are each examined in separate chapters focused solely on those methods. Along with various separation techniques, the book also has several chapters dedicated to diffusion and mass transfer. Within each chapter the author delves into the underlying principles, calculations, design considerations, and real-world applications associated with the specific technique. By adopting this comprehensive approach to each process, the book ensures that readers, regardless of their level of expertise, can gradually and effectively grasp the complexities of separation process engineering, building a solid foundation of knowledge as they progress through the book.

In addition to its systematic approach, the book effectively utilizes numerous examples and simulation studies to enhance readers' understanding of the subject matter. The

inclusion of real-world examples helps bridge the gap between theory and practice, enabling readers to grasp the complexities and challenges involved in separation process engineering. The incorporation of simulation problems proves especially advantageous for aspiring chemical engineers as it effectively bridges the gap between theoretical knowledge and practical industry experience.

The fifth edition of *Separation Process Engineering* builds upon the success of the previous editions by offering relevant updates and expanding its scope to help students and professionals grasp the complexities of modern separation techniques. Some of the new and updated content includes hybrid separations, batch washing, steam distillation, forward osmosis, and microfiltration. However, the most significant addition to content is a completely new chapter on melt crystallization. For the benefit of instructors and students alike, this edition has added over 300 new and updated homework problems.

However, one minor drawback of the book is its limited interactive participation for students. In the current educational landscape, textbooks are increasingly incorporating interactive elements such as auto-graded reading quizzes and personalized homework problems. These features enhance student engagement and provide immediate feedback, fostering a more dynamic and immersive learning experience. While *Separation Process Engineering* excels in its comprehensive content and clarity, the absence of these interactive components may be perceived as a limitation in comparison to more modern textbooks that actively promote student involvement and interactivity.

Overall, *Separation Process Engineering* remains a valuable resource for students, researchers, and professionals in the field of chemical engineering. It covers a broad spectrum of separation processes, providing valuable practical insights and utilizing real-world examples to enhance comprehension. This book remains an essential textbook for anyone seeking a comprehensive understanding of separation process engineering. A must have on your bookshelf! □