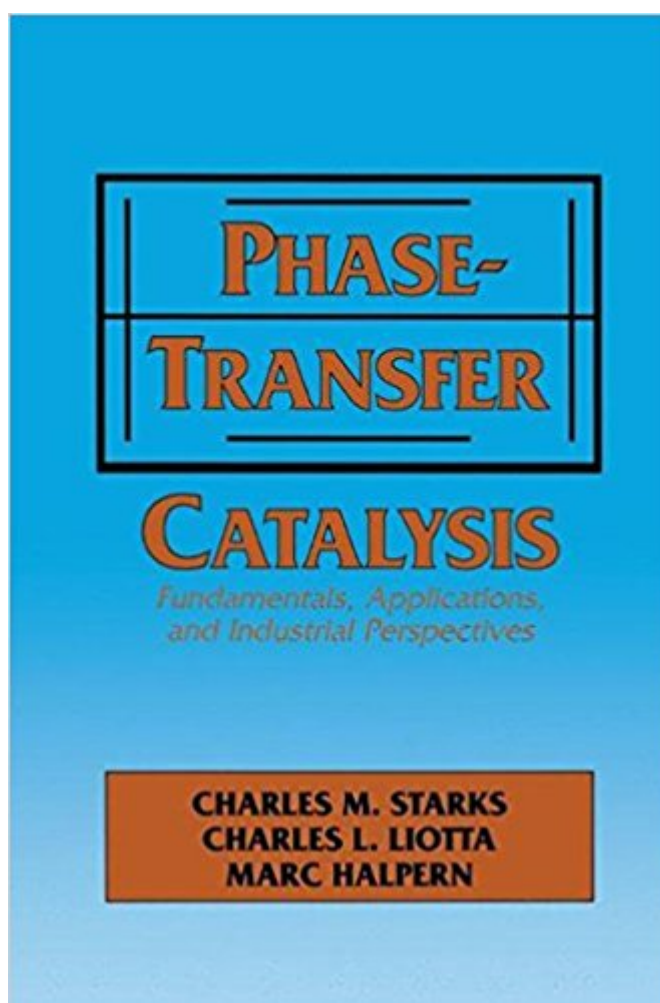




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Phase-Transfer Catalysis: Fundamentals, Applications, And Industrial Perspectives



Synopsis

Since 1971 when useful working concepts for the technique of phase-transfer catalysis (PTC) were introduced, the understanding, development, and applications of this method for conducting organic reactions has expanded exponentially. PTC has brought vast new dimensions and options to chemists and chemical engineers. From its use in less than ten commercial processes in 1975, PTC use has increased so that in the early 1990s it is involved in more than 600 industrial applications to manufacture products valued at between 10 and 20 billion U.S. dollars. PTC is widely used for simple organic reactions, steps in synthesis of pharmaceuticals, agricultural chemicals, perfumes, flavorants, and dyes; for specialty polymerization reactions, polymer modifications, and monomer synthesis; for pollution and environmental control processes; for analysis of trace organic and inorganic compounds; and for many other applications. Often, PTC offers the best (and sometimes only) practical technique to obtain certain products. The authors' experience in teaching a short course on phase-transfer catalysis has shown to us that a newcomer to PTC can easily be frustrated and confused by the large amount of information available in the literature and in patents. The purpose of this book, therefore, was to bring this information together in a logical and user-friendly way, without sacrificing matters of scholarly and fundamental importance.

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This book is the definitive reference on phase-transfer catalysis (PTC), written by the three foremost industrial and academic PTC experts in the world. Phase-Transfer Catalysis, the first practical guide to performing PTC in industry, includes key information and analyses found in no other publication. It will be a valuable resource for synthetic organic chemists, polymer chemists, process chemists, developmental chemists, and chemical engineers in academia and industry. Organic process chemists seeking greater process flexibility, reduced manufacturing costs and pollution, and easier compliance with environmental regulations will find it an indispensable reference. The book provides a thorough introduction to the fundamentals of PTC as a synthetic organic chemistry technique, including reaction mechanisms, selectivity, rates, and kinetics. It gives specific guidelines on how to optimize catalyst, solvent, base, hydration, and more, based on reaction characteristics. The section on applications includes nucleophilic displacement reactions, oxidation and reduction reactions, and such special topics as insoluble PTC (triphasic catalysis), polymerization, chiral catalysis, applications in environmental and analytical chemistry, and transition metal co-catalyzed PTC. Throughout the book, PTC applications in key industries are discussed - including organic chemicals, polymers, pharmaceuticals, agrichemicals, monomers, petrochemicals, flavors and fragrances, additives, dyes, and specialty chemicals.

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