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BOOK REVIEW

Phase-transfer catalysis fundamentals, applications, and industrial perspectives

CHARLES M. STARKS, CHARLES L. LIOTTA and MARC HALPERN

Chapman & Hall, New York, 1994, 9.25" × 6.25"; xiv + 668 pp. ISBN 0-412-04071-9; \$89.95

Phase transfer catalysis is a concept and technique that has revolutionized traditional synthesis. It is almost unfortunate that this methodology has made much preparative chemistry not only better but cheaper. The latter has given the field the apparently pejorative cast of "industrially important." It is certainly that but phase-transfer catalysis is a fundamental concept and approach and it has much to offer to those required to do synthesis be we academic, industrial, or dilettante.

The number of academic scientists involved in phase-transfer catalysis has diminished over the years in part because the complexity of the issues involved were not appreciated. Thus much of the developmental work was conducted in the industrial setting where less attention was given to publication. Even so, an enormous literature has grown up in this important area of chemistry. It is directly relevant to supramolecular chemistry for many reasons, not least of which is that selective complexation of species occurs and is different in different solvents.

This is the first volume on phase transfer catalysis that deals in detail with mechanism and methods since Starks and Liotta published their first book about 15 years ago. The recent volume by Goldberg is a good book but does not try to be as comprehensive as the present volume. It should also be noted that Starks is a father of phase-transfer catalysis and gave the field its name. Liotta was involved (largely in crown-mediated phase transfer catalysis) from the very early days. They are joined by

Halpern in the present volume and present a broad and clear perspective on the field.

The volume is logically divided into fifteen chapters as follows. (1) Basic concepts in phase-transfer catalysis; (2) PTC: Fundamentals I; (3) PTC: Fundamentals II; (4) Phase-transfer catalysis; (5) Insoluble phase-transfer catalysis; (6) Variables in reaction design for laboratory and industrial applications of PTC; (7) PTC displacement reactions with simple anions; (8) PTC reactions with strong bases; (9) PTC: Polymerization and polymer modification; (10) PTC oxidations; (11) PT-Catalyzed Reductions; (12) PTC: Chiral phase-transfer catalyzed formation of carbon-carbon bonds; (13) PTC-Transition metal cocatalyzed reactions; (14) PTC in analytical chemistry; and (15) PTC: Industrial perspectives. There is a detailed general index but no author index. Some sections are empirical and schematic and others are highly mathematical. This undoubtedly reflects individual contributions by the three authors.

A minor criticism is that the graphs, equations, and charts are variable in quality and format. Even the fonts used for preparing chemical structures and equations differ suggesting that each author prepared figures and these were used directly. As noted, this minor criticism and will not detract from the breadth, depth, and quality of coverage in this volume.

– George W. Gokel
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