About 90% by weight of the organic chemicals used worldwide come from petroleum and natural gas and Chapter 2 explains how the seven chemicals on which the industry is based—ethylene, propylene, the C_4 olefins, benzene, toluene, the xylenes and methane—are derived from these sources. The importance of the techno-commercial interface between petroleum refining and the petrochemical industry is emphasized in this chapter. Separate chapters then describe how a wide range of chemicals and polymers are manufactured from each of these seven basic chemicals, with two additional chapters covering products derived from C_5 olefins and alkanes (other than methane) respectively. The chemistry involved is described in a way which points out significant aspects of the technology involved and sufficient numerical data, e.g. product prices, production volumes and changes of these with time, given to indicate the commercial importance of the major products. After dealing with the major products, for example the polyethylenes, most chapters contain sections dealing with 'lesser-volume' products, e.g. ethylene oxide derivatives in the chapter concerned with ethylene.

The 10% of organic chemicals and polymers not derived from petroleum or natural gas are covered in three chapters. The first deals with chemicals from coal, which although important to the development of the industry is now relegated mainly to production of a limited range of aromatic and heterocyclic chemicals (including naphthalene) from coke oven distillate. The industrial chemistry of fats and oils, concerned mainly with surfactants, is covered in the next chapter, while the third chapter in this group deals with a wide range of special products based on carbohydrates, including starch and cellulose.

Polymer production consumes about half the total volume of organic chemicals produced, so the penultimate chapter, 'How polymers are made', is concerned entirely with these materials. It indicates the application areas of polymers, e.g. plastics, fibres and elastomers, and lists the more important polymers in these areas, giving the volumes produced in the USA in 1993. Basic polymerization chemistry is reviewed, starting with step-growth polycondensations and proceeding through the more important chain-growth polymerization mechanisms; it also gives some examples of step-growth polymerizations leading to cross-linked products such as epoxy resins. This chapter also provides a brief review of the physical properties of polymers on which their usefulness depends. The last chapter is concerned with 'Industrial catalysis' and provides a brief but wide-ranging review of this very important area.

This book will provide a useful review of the field for both students and graduates with some knowledge of organic chemistry. The references to each chapter are given mainly in the form of annotated bibliographies which provide introductions to the relevant literature. Thus, this book can also be used as a source reference to searchers looking for detailed information about particular areas in this wide general field.

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Aqueous Organometallic Chemistry and Catalysis
I. T. Horváth and F. Joó (eds)
Kluwer Academic Publishers, Dordrecht, 1995
317 pages. £117
ISBN 0–7923–3703–4

There have been two recent review articles[1,2] on homogeneous catalysis by metal complexes in aqueous solution, so the appearance of a book on the same topic may strike some readers as superfluous. In any case this book is not exclusively concerned with catalysis but that is the main theme. The reason for its publication is to report the proceedings of a NATO Advanced Research Workshop on Aqueous Organometallic Chemistry and Catalysis held at Debrecen, Hungary, from 29 August to 1 September 1994. The book consists of three short introductory, mainly historical, articles, an eight-page summary of the discussion at the conference, and 28 contributed papers (296 pages). There are also separate Subject and Author indexes. The historical survey omits the Wacker process.

Over half the contributions deal with catalytic hydrogenation or hydroformylation, but other topics include olefin metathesis, the Heck reaction, oxidation of chlorinated hydrocarbons and coordination compounds of nucleotide bases. A major attraction of the book is that it describes the diversity of methods by which organometallic chemistry can be carried out in water. Thus, in addition to the well-known use of sulphonated phosphines in the Rhône Poulenc/Ruhrchemie hydroformylation process,[3] the following methods are described: (1) the use of phase-transfer catalysts in addition to the organometallic catalyst; (2) supported aqueous-phase catalysts in which a water-soluble homogeneous catalyst is adsorbed in a thin layer of aqueous solution on a solid support; (3) micellar and vesicular systems in conjunction with a homogeneous catalyst. The final three contributions in the book are concerned with the hydrogenation of biological systems and two of these describe work done by one of the book's editors (F. Joó) at Debrecen.

To summarize: this is an interesting book and the general standard of the contributions is very high. It covers a wide range of topics although, strangely for a book on aqueous chemistry, hydration is not mentioned.

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