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BOOK REVIEW

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Naftni i petrokemijski procesi i proizvodi [Petroleum and Petrochemical Processes and Products]

University textbook, Zagreb, 2005
472 pages, 167 figures, 70 tables, 202 ref.
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The book *Naftni i petrokemijski procesi i proizvodi* (*Petroleum and Petrochemical Processes and Products*) written by Professor Zvonimir Janović, Faculty of Chemical Engineering and Technology, University of Zagreb, is the first of the kind in the Croatian language. The author very successfully combines his experience of a scientist, an engineer in the field having spent some time in industry (Research and Development Institute, INA-Zagreb) and a university professor teaching graduate and undergraduate courses.

Petroleum and Petrochemical Processes and Products is a university level textbook dealing with the principles of petroleum refining, natural gas, and the most important petrochemical processes, including raw materials, intermediates and final products. Being the first such synthesizing project in the Croatian language, it purports to cover the whole field and to give an overview of the main principles of chemical engineering and their relation to chemical reaction mechanisms, process parameters and optimal process conditions, along with the corresponding products. Besides technological, it also touches on certain ecological and economical aspects of the described processes and products.

The book is principally intended for undergraduate and graduate students of chemical engineering, chemical technology, chemistry and petroleum engineering, but can also be useful to all those professionally engaged in research, development or production, or simply anybody prone to renew, improve or extend their knowledge in the field.

The book contains 472 pages, 167 figures, 70 tables, a considerable amount of formulae and mathematical equations, and 202 references. It is divided into six chapters, followed by a literature survey and a subject index and a two-page English summary. In addition to the general bibliography, each chapter contains an up-to-date list of secondary literature: monographic studies, review articles and some original scientific papers.

The first chapter, *Uvod* (*Introduction*), 38 pages, offers a brief description of organic chemical industry historical development and importance, followed by a general discussion on chemical reactions and process parameters, conversion, selectivity and yield, as well as optimization, ecology and economy.

The second chapter, *Nafta* (*Petroleum*), 120 pages, gives the origin, exploration, chemical composition, and petroleum classification, followed by the main petroleum products: gasoline, diesel fuel, gas oil, fuel oil, petroleum coke, asphalt, lubricating oil; separation processes: atmospheric and vacuum distillation; conversion processes: thermal and catalytic cracking, hydrocracking, catalytic reforming, isomerization, alkylation and polymerization processes; treatment processes: hydrodesulphurization, Claus' process; basic mineral oil production: dearomatization, dewaxing, deasphalting; asphalt production and properties.

The third chapter, *Prirodni plin i proizvodi metana* (*Natural Gas and Methane Derivatives*), 72 pages, describes in detail natural gas processing and its use as a raw material; classification and composition; treating processes: cleaning, drying and higher hydrocarbons separation; methane derivatives: synthetic gas, methanol, acetic acid; Fischer-Tropsch synthesis, ammonia; methane halogenation processes and products.

Piroliza ugljikovodika i proizvodi etilena (*Hydrocarbon Pyrolysis and Ethylene Derivatives*), 67 pages, is the fourth chapter. It covers steam cracking: basic concepts, reactions, mechanisms, process parameters and products; ethylene derivatives: polyethylene, vinyl chloride, poly(vinyl chloride), ethylene oxide and glycol, vinyl acetate, ethanol.

The fifth chapter, *Proizvodi propilena i C4 ugljikovodika* (*Propylene and C4 hydrocarbon derivatives*), 75 pages, describes polypropylene processes and properties, propylene oxide, isopropanol, acrylic acid, acrylonitrile, propylene chlorination; oxo-synthesis; alcohols and acids; butane derivatives: maleic anhydride, dehydrogenation; isobutene derivatives: polyisobutene, methyl-*tert*-butyl-ether; butadiene from C4 fraction and butane, butadiene

oligomers and polymers; chloroprene and polychloroprene; isoprene and polyisoprene.

The sixth chapter, *Aromatski ugljikovodici* (*Aromatic Hydrocarbons*), 69 pages, deals with raw materials and benzene/toluene/xylene mixture separation; benzene derivatives: ethyl benzene and styrene, cyclohexane and derivatives; styrene based polymers; phenol: production processes and polymers; toluene derivatives: diisocyanate, polyurethanes; xylene derivatives: phthalic anhydride, isophthalic acid, terephthalic acid and poly(ethylene terephthalate).

The book is both well written and presented. All the basic concepts, especially technological processes, are systematically described, documented with a number of examples, equations, tables and illustrations. The author successfully describes the relationship between the process parameters and product properties and how this correlation could be affected in the course of reactions. Moreover, the book is technically well equipped.

Therefore, I recommend this book not only to students, but also to everybody involved in the field of petroleum processing and petrochemistry, extending from chemistry and chemical engineering to the production and applications.

Franjo Ranogajec