

This book is the new methanol bible! Back in the 1980s, Friedrich Asinger, a past director of the institute of technical chemistry at the RWTH Aachen, realized that methanol is a stock chemical of enormous significance and potential. Methanol can be relatively simply and economically produced from all materials that contain organic carbon, such as coal, oil, natural gas, or biomass. At the other end it can be used as a medium for energy transfer and be converted into a wide range of other products. These points were made by Asinger in 1986 in his book *Methanol—Chemie- und Energierohstoff—Die Mobilisation der Kohle*, which was published by Springer in German and has been out of print for a long time. As it was never translated into English, it has remained relatively unknown. 20 years later the Nobel laureate George A. Olah wrote a book together with two co-authors with similar content: *Beyond Oil and Gas: The Methanol Economy*. As this book was published in English, it was read worldwide and is well-known.

Now five editors have followed the initiative of Heribert Offermanns, who was a former student and assistant of Asinger and was long a research and development leader at the former Degussa AG, and have the book by Asinger completely reworked and supplemented: from the old book with about 400 pages comes a new work with about 650 pages, numerous (and also color) figures and flow charts and more than 3000 references. The five editors have made good use of their connections to the chemical industry and universities and could win over further authors for this book: 46 top-class authors have provided their knowledge in eight chapters. Books with so many authors are usually characterized by many different styles and overlap. The five editors have however succeeded in avoiding this to a large extent.

The book is divided into a short general section (about 50 pages) and a main part with specific information. Then, the topic is introduced in general terms (Chapter 1), the future of fossil-based raw materials are discussed (Chapter 2), and under the topic “Technical Photosynthesis” (Chapter 3) the life-cycle of the elements C, H, O, and N (including the possible energy sources) are treated. The main part begins with a very thorough Chapter 4, which covers variants of the methanol synthesis. The different starting materials are covered in

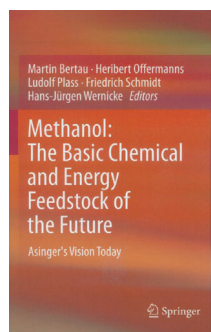
detail, and the various paths to synthesis gas and the numerous process alternatives for methanol synthesis are presented, including reactor types, catalysts, and methods of work-up. A section on methanol synthesis from carbon dioxide is also necessarily included.

The short but important Chapter 5 describes the properties of methanol and includes all necessary information about toxicology, transportation, storage, and safety. The substantial Chapter 6 lists the uses of methanol: the numerous methods to utilize methanol as a C_1 building block for the construction of basic chemicals, for example acetic acid and the corresponding anhydride, formaldehyde, methylamine and methyl halides, and methyl esters. Further sections deal with the use of methanol as a fuel or fuel additive and the Mobil conversion processes to gasoline (MTG) or olefins (MTO). Short sections on methanol splitting, on methanol fuel cells, and on methanol in biochemistry are also to be found. Chapter 7 contains economic evaluations, and Chapter 8 considers methanol as a hydrogen and energy source.

All of the chapters are up-to-date; the references are up to 2013. The editors and the authors have achieved a really complete current work of reference on this important topic. Although the synthesis and chemistry of methanol is quite old (the high-pressure synthesis was developed back in the 1920s), the topic is still very topical. When oil will become ever scarcer in the coming years and decades, the most practical and economic alternatives for fuels and heating oils have to be established. Hydrogen from water electrolysis using solar energy is a promising candidate to replace the hydrocarbons that are currently used as energy medium. As the handling of hydrogen is however complicated, methanol offers itself as a viable transportable and storable storage material. Furthermore, if methanol is produced from carbon dioxide and hydrogen in the future, there are further benefits in the use of methanol not only as a versatile chemical intermediate but also as a flexible and convenient energy storage material. All of these points are being currently investigated and discussed in research and industry: this book from Bertau et al. has thus appeared at just the right moment!

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