

The Development of Catalysis: A History of Key Processes and Personas in Catalytic Science and Technology

Adriano Zecchina and Salvatore Califano

Wiley, 2017

352 pages, \$125.00 (e-book \$100.99)

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Catalysis covers a vast field of academic to industrial research and has undoubtedly changed the world, as it has allowed the introduction of modern fuels, chemicals, and plastics. This book describes the history of catalysis and its path to modern-day catalysis research. The authors are well-qualified to write this history, as they have dedicated their careers to catalysis.

The chapters are focused on the following: the first large-scale industrial processes, historical development of theories, catalytic processes associated with the petroleum industry, surface methods, heterogeneous catalysis, materials science, photocatalysis, and enzymatic catalysis. With these topics, the book covers most of the important industrial processes used today, or the precursors to the present processes, and their historical impact on industry. The chapters logically follow the

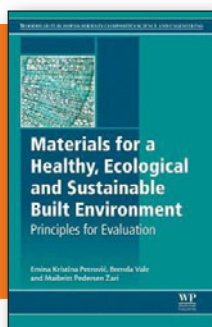
increasing complexity of catalysis from early homogeneous catalysis processes to modern heterogeneous-based ones, which are highly dependent on materials and surfaces. The final chapters are dedicated to more emergent areas of catalysis.

Even though I have worked in catalysis, the amount of material covered by the authors quickly became overwhelming. The authors seem intent on discussing a wide breadth of catalysis history. Because of this attempt, most fields are scantily covered. For instance, a page and a half is dedicated to hydrodesulfurization, a key catalytic process required to remove sulfur from oil. The revolutionary olefin polymerization process, which earned Ziegler and Natta a Nobel Prize, is covered in five pages. I found it difficult from the short synopsis of each process to get any in-depth scientific understanding—more of a brush stroke.

The authors focus heavily on researchers involved in catalysis research, their academic training, and research associates. With the focus on the personae, many chapters are filled with photographs of the researchers, and their chemistry is simply described in the text. A few of the chapters attempt to illustrate the content more in chemical terms—for instance, the chapter on materials science and catalysis design is well illustrated. The book assumes that the reader has a strong understanding of chemistry.

I surmise that the authors' goal was to cover catalysis as broadly as possible and provide excellent references (historical and contemporary) so the reader could follow up in more detail. The book is thorough in its breadth and is geared toward a highly technical audience. It will likely not appeal to a nontechnical reader, and even undergraduate students might struggle with the content. However, it serves as a good reference for researchers in the field of catalysis who wish to understand their heritage and would like a good starting resource for their research.

Reviewer: Karen Swider Lyons researches fuel cell and battery materials and their integration into naval systems in Alexandria, Va., USA.



Materials for a Healthy, Ecological and Sustainable Built Environment: Principles for Evaluation

Emina Kristina Petrović, Brenda Vale, and Maibritt Pedersen Zari

Woodhead Publishing, 2017

416 pages, \$161.25 (e-book \$161.25)

ISBN 9780081007075

This book contains technical information relevant to contemporary architecture and the environmental impact from the construction materials for various ecosystems under different conditions. It is focused on proposing principles for the evaluation of building materials in relation to their suitability for sustainable construction, for example, materials that are grown (grasses, hemp, bamboo, vines, and

goods), materials that are extracted (earth, stone, brick, and concrete), materials that are made (glass, metals, steel, copper, aluminum, zinc, and lead), and plastics or composites. The book is comprised of four parts: Part I—Selecting Building Materials for Reduced Impacts on Ecosystem Services, Part II—Choosing Sustainable Materials, Part III—Indoor Toxicity from Building Materials, and Part IV—Case Studies.

Part I discusses the selection of building materials for reducing “ecosystem services,” which are carried out for different types of materials using sustainability analyses. The topic can be complex, as a building material can be considered sustainable or not when understood in the context of the design, climate, and culture.

Part II is about the sustainable materials selection by professionals engaged in design and specifications. There is an interesting description of the usage of construction materials, applications, and, most importantly, sustainability recommendations to minimize the ecological impact when designers and architects select the most suitable materials (those with a long life, low maintenance, and low-embodied energy).