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Temperature; 3.4 Conclusions; 4: The Fascinating Structure and the Potential of Metal-Organic Frameworks; 4.1 Introduction; 4.2 Preparation and Structure; 4.3 Applications; 4.4 Conclusion; 5: Enzymatic Catalysis Today and Tomorrow; 5.1 Introduction 5.2 Enzymatic Catalysis Today 5.3 Enzymatic Catalysts of Tomorrow; 5.4 Concluding Remarks; 6: Oxidation Tools in the Synthesis of Catalysts and Related Functional Materials; 6.1 Introduction; 6.2 Preparation Strategies Involving Chemical Oxidative Approaches; 6.3 A Catalytic Oxidation Tool. Fenton Chemistry in Solid Catalyst Synthesis; 6.4 First Concept in Catalyst Design. Shifting Complexation Equilibria for Ion-Exchange by Oxidation of the Organic Chelates; 6.5 Second Concept in Catalyst Design. One-Pot Synthesis of Fe Zeolite Catalysts 6.6 Third Concept in Catalyst Design. Fenton Detemplation. Mild Organic Template Removal in Micro- and Mesoporous Molecular Sieves 6.7 Concluding Remarks; 7: Challenges in Catalysis for Sustainability; 7.1 Introduction; 7.2 Population and Human Resources; 7.3 Food Security; 7.4 Species and Ecosystem; 7.5 Energy; 7.6 Industry; 7.7 The Urban Challenge; 7.8 Future Advances in Catalysis for Sustainability; 7.9 Conclusions; 8: Catalytic Engineering in the Processing of Biomass into Chemicals; 8.1 Introduction; 8.2 Chemicals and Fuels from Biomass 8.3 Chemical Reaction Engineering in Biomass Transformation 8.4 Conclusions and Future Perspectives; 9: Structured Reactors, a Wealth of Opportunities; 9.1 Introduction; 9.2 Monoliths; 9.3 Other Structured Catalysts; 9.4 Foams; 9.5 Why are Industrial Applications of Structured Reactors so Scarce?; 9.6 Concluding Remarks; 10: Zeolite Membranes in Catalysis: What Is New and How Bright Is the Future?; 10.1 Introduction; 10.2 Zeolites: a Versatile, Well-Defined Class of Materials; 10.3 Application Options; 10.4 Potential Applications; 10.5 Current Hurdles 10.6 Concluding Remarks and Future Outlook

## Sommario/riassunto

The chemical process industry faces a tremendous challenge of supplying a growing and ever more demanding global population with the products we need. The average efficiency at which resources are converted into the final products is however still dramatically low. The most obvious solution is to carry out chemical conversions at much higher yields and selectivity and this is where active and selective catalysts and efficient chemical reactors play a crucial role. Written by an international team of highly experienced editors and authors from academia and industry, this ready reference focuses