



# In-situ Characterization of Heterogeneous Catalysts

*José A. Rodríguez, Jonathan C. Hanson, Peter J. Chupas*

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## **Helps researchers develop new catalysts for sustainable fuel and chemical production**

Reviewing the latest developments in the field, this book explores the in-situ characterization of heterogeneous catalysts, enabling readers to take full advantage of the sophisticated techniques used to study heterogeneous catalysts and reaction mechanisms. In using these techniques, readers can learn to improve the selectivity and the performance of catalysts and how to prepare catalysts as efficiently as possible, with minimum waste.

In-situ Characterization of Heterogeneous Catalysts features contributions from leading experts in the field of catalysis. It begins with an introduction to the fundamentals and then covers:

- Characterization of electronic and structural properties of catalysts using X-ray absorption fine structure spectroscopy
- Techniques for structural characterization based on X-ray diffraction, neutron scattering, and pair distribution function analysis
- Microscopy and morphological studies
- Techniques for studying the interaction of adsorbates with catalyst surfaces, including infrared spectroscopy, Raman spectroscopy, EPR, and moderate pressure XPS
- Integration of techniques that provide information on the structural properties of catalysts with techniques that facilitate the study of surface reactions

Throughout the book, detailed examples illustrate how techniques for studying catalysts and reaction mechanisms can be applied to solve a broad range of problems in heterogeneous catalysis. Detailed figures help readers better understand how and why the techniques discussed in the book work. At the end of each chapter, an extensive set of references leads to the primary literature in the field.

By explaining step by step modern techniques for the in-situ characterization of heterogeneous catalysts, this book enables chemical scientists and engineers to better understand catalyst behavior and design new catalysts for green, sustainable fuel and chemical production.

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