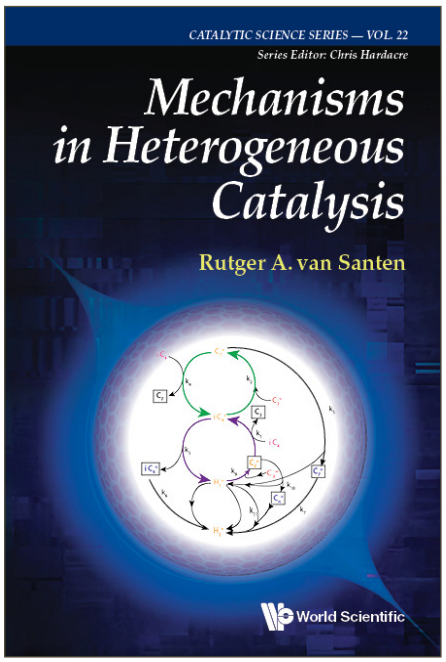
Mechanisms in Heterogeneous Catalysis



By Rutger A. van Santen
(*Eindhoven University of Technology, The Netherlands*)

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ABOUT THE BOOK

"This new book by Rutger van Santen approaches the subject of heterogeneous catalysis from the understanding that can be gained from molecular physical chemistry. It is unique in this respect and will rapidly be adopted as the 'must read' text."

— Graham J Hutchings CBE FRS
Regius Professor of Chemistry, Cardiff University, UK.

Heterogeneous catalysis has developed over the past two centuries as a technology driven by the needs of society, and is part of Nobel Prize-winning science. This book describes the spectacular increase in molecular understanding of heterogenous catalytic reactions in important industrial processes. Reaction mechanism and kinetics are discussed with a unique focus on their relation with the inorganic chemistry of the catalyst material. An introductory chapter presents the development of catalysis science and catalyst discovery from a historical perspective. Five chapters that form the thrust of the book are organized by type of reaction, reactivity principles, and mechanistic theories, which provide the scientific basis to structure-function relationships of catalyst performance. Present-day challenges to catalysis are sketched in a final chapter. Written by one of the world's leading experts on the topic, this definitive text is an essential reference for students, researchers and engineers working in this multibillion-dollar field.

READERSHIP

Researchers, academics, instructors, engineers, graduate and undergraduate students in catalysis, surface science, chemistry (inorganic, physical, computational) and chemical engineering. The first half of the book will also be appealing to historians of science.

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ABOUT THE AUTHOR

Dr Rutger van Santen is Emeritus Professor at the Institute for Complex Molecular Systems and Faculty of Chemistry and Chemical Engineering of the Eindhoven University of Technology, The Netherlands, where he was previously Rector Magnificus. He is an Elected Member of the Royal Dutch Academy of Arts and Sciences (KNAW) and a Foreign Member of the US National Academy of Engineering (NAE). He is considered one of the pioneers in the use of quantum chemical methods in computational heterogeneous catalysis. He has published over 800 papers, written and edited 20 books, and owns 22 patents, with a h-index of 92. His research achievements has been encapsulated in a Festschrift, *40 years of Catalysis Research: Rutger van Santen's Journey Through Chemical Complexity* (2012).

Professor van Santen is also the Founding Director of the Netherlands Institute for Catalysis Research (NIOK) and the Dutch National Research School Combination-Catalysis (NRSC-C). He has received many prestigious awards, such as the 1981 Gold Medal from the Royal Dutch Chemical Society, the 1992 Ciapetta Award from the North American Catalysis Society, the 1997 Bourke Award from the UK Royal Society of Chemistry, the 1997 Spinoza Award from the Dutch Research Council, the 2000 Karl Ziegler Prize from the Max Planck Institut für Kohlenforschung, the 2001 Alwin Mittasch Medal from the German Catalysis Society, the 2009 Holst Award from Eindhoven University of Technology, and the 2010 Francois Gault Award from the European Federation of Catalysis Societies. He also received an Honorary Doctorate from the National Technical University of Ukraine and is a Knight of the Order of the Dutch Lion.

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