- Foreword Gabor Samorjai p. iii
- Preface p. v
- Contributors p. xiii
- I. Theory of Nanoparticle Catalysis and Electrocatalysis
- 1. Theory and Modeling of Catalytic and Electrocatalytic Reactions Marc T. M. Koper and Rutger A. van Santen and Matthew Neurock p. 1
- 2. Simulations of the Reaction Kinetics on Nanometer-Sized Supported Catalyst Particles V. P. Zhdanov and B. Kasemo p. 35
- 3. Electronic Structure and Chemisorption Properties of Supported Metal Clusters: Model Calculations Gianfranco Pacchioni and Francesc Illas p. 65
- II. Model Systems: From Single Crystals to Nanoparticles
- 4. State-of-the-Art Characterization of Single-Crystal Surfaces: A View of Nanostructures Matthias Batzill and Santanu Banerjee and Bruce E. Koel p. 109
- 5. Single-Crystal Surfaces as Model Platinum-Based Hydrogen Fuel Cell Electrocatalysts Brian E. Hayden p. 171
- 6. Electrochemical Nanostructuring of Surfaces Rolf Schuster and Gerhard Ertl p. 211
- 7. Adsorption and Reaction at Supported Model Catalysts Claude R. Henry p. 239
- 8. Size-Dependent Electronic, Structural, and Catalytic Properties of Metal Clusters Supported on Ultrathin Oxide Films A. K. Santra and D. W. Goodman p. 281
- 9. Physical and Electrochemical Characterization of Bimetallic Nanoparticle Electrocatalysts N. M. Markovic and V. Radmilovic and P. N. Ross, Jr. p. 311
- III. Synthetic Approaches in Nanoparticle Catalysis and Electrocatalysis
- 10. Nanomaterials as Precursors for Electrocatalysts Helmut Bonnemann and Ryan Richards p. 343
- 11. Preparation, Characterization, and Properties of Bimetallic Nanoparticles Toshiharu Teranishi and Naoki Toshima p. 379
- 12. Physicochemical Aspects of Preparation of Carbon-Supported Noble Metal Catalysts P. A. Simonov and V. A. Likholobov p. 409
- IV. Advanced Experimental Concepts
- 13. NMR Investigations of Heterogeneous and Electrochemical Catalysts Y. Y. Tong and J. J. van der Klink p. 455
- 14. In-Situ X-Ray Absorption Spectroscopy of Carbon-Supported Pt and Pt-Alloy Electrocatalysts: Correlation of Electrocatalytic Activity with Particle Size and Alloying Sanjeev Mukerjee p. 501
- 15. STM and Infrared Spectroscopy in Studies of Fuel Cell Model Catalysts: Particle Structure and Reactivity J. A. Collins and U. Stimming p. 531
- V. Particle Size, Support, and Promotional Effects
- 16. Electrochemical and Chemical Promotion by Alkalis with Metal Films and Nanoparticles Richard M. Lambert p. 583
- 17. Metal-Support Interaction in Low-Temperature Fuel Cell Electrocatalysts A. S. Arico and P. L. Antonucci and V. Antonucci p. 613
- 18. Effects of Size and Contact Structure of Supported Noble Metal Catalysts in Low-Temperature CO Oxidation Masatake Haruta and Susumu Tsubota p. 645
- 19. Promotion, Electrochemical Promotion, and Metal-Support Interactions: The Unifying Role of Spillover Constantinos G. Vayenas and C. Pliangos and S. Brosda and D. Tsiplakides p. 667

- 20. Support Effects on Catalytic Performance of Nanoparticles Xenophon E. Verykios p. 745
- 21. Abnormal Infrared Effects of Nanometer-Scale Thin Film Material of Platinum Group Metals and Alloys at Electrode-Electrolyte Interfaces Shi-Gang Sun p. 785
- 22. Design of Electrocatalysts for Fuel Cells Masahiro Watanabe p. 827
- 23. Effects of Particle Size and Support on Some Catalytic Properties of Metallic and Bimetallic Catalysts Bernard Coq and Francois Figueras p. 847
- VI. Advanced Electrocatalytic Materials
- 24. Conductive Metal-Oxide Nanoparticles on Synthetic Boron-Doped Diamond Surfaces I. Duo and Sergio Ferro and Achille De Battisti and C. Comninellis p. 877
- 25. Electrocatalysis with Electron-Conducting Polymers Modified by Noble Metal Nanoparticles C. Lamy and J.-M. Leger p. 907
- 26. Novel Nanostructured Material Based on Transition-Metal Compounds for Electrocatalysis Nicolas Alonso-Vante p. 931
- Index p. 959