

## Index

- Adsorbents, 381  
Adsorbent-supported photocatalysts, 503  
Adsorption reactions, 34, 229, 261, 290, 311, 603, 633  
Air purification, 404  
Alumina ( $\text{Al}_2\text{O}_3$ ), 38, 51, 82, 129, 153, 203, 229, 270, 295, 359, 382, 501, 607, 634, 685  
AMI method, 227  
Antimony oxide ( $\text{Sb}_2\text{O}_3$ ), 206  
Aqueous design of metal-oxide nanostructures, 66  
Aqueous interfacial thermodynamics, 49  
Amorphization of nanostructures, 271  
Atomic force microscopy, 156  
Atomic pair distribution function (PDF), 139  
Atomistic models, 247
- Barium oxide ( $\text{BaO}$ ), 129, 177, 202, 270, 292  
Barium titanate ( $\text{BaTiO}_3$ ), 31  
Beryllium oxide ( $\text{BeO}$ ), 202  
Bioceramics, 691  
Bond order-length correlation, 17  
Bond length-strength correlation, 18  
Bond band-barrier correlation, 33
- Cadmium oxide ( $\text{CdO}$ ), 172, 422  
Calcium oxide ( $\text{CaO}$ ), 82, 200, 267, 292, 314, 340, 382, 424, 607, 634  
Calcium titanate ( $\text{CaTiO}_3$ ), 573  
Catalytic combustion of hydrocarbons, 563  
Carbon monoxide, 311, 611  
CATIVIC method, 231  
Ceramics, 683  
Cerium oxide ( $\text{CeO}_2$ ), 51, 102, 128, 141, 168, 172, 225, 253, 327, 357, 493, 612, 634  
Chemical vapor deposition (CVD), 119  
Chromium oxide ( $\text{Cr}_2\text{O}_3$ ), 51, 82, 149, 370, 612, 636  
Combustion control, 439, 563  
Combustion of hydrocarbons, 573  
Computation of electronic structure, 189  
Composite photocatalytic systems, 501  
Conductivity measuring sensors, 426  
Configuration interaction (CI) methods, 193  
Copper-doped ceria ( $\text{Ce}_{1-x}\text{Cu}_x\text{O}_2$ ), 169, 655  
Cobalt oxide ( $\text{CoO}$ ), 209, 315, 612  
Cobalt oxide ( $\text{Co}_2\text{O}_3$ ), 102  
Cobalt oxide ( $\text{Co}_3\text{O}_4$ ), 51, 370, 604  
Copper oxide ( $\text{Cu}_2\text{O}$ ), 35, 172  
Copper oxide ( $\text{Cu}_3\text{O}_2$ ), 35  
Copper oxide ( $\text{CuO}$ ), 51, 149, 370, 392, 604, 636, 655  
Coprecipitation methods, 85  
Core-level photoemission, 176
- Density functional theory, 195, 289  
Design of oxide nanostructures, 49  
Destruction of chemical warfare agents, 396  
Destruction of nitrogen oxides ( $\text{DeNO}_x$ ), 603  
Destruction of sulfur dioxide ( $\text{DeSO}_x$ ), 633  
Diffusion of charge, 539  
Dye-sensitized solar cells, 466
- Electroceramics, 690  
Electrochemical devices, 451  
Electronic properties characterization, 165  
Electronic conduction, 354, 411, 426, 457  
Electron paramagnetic resonance spectroscopy (EPR), 319  
Environmental remediation, 335, 381, 563  
Europium oxide ( $\text{EuO}$ ), 84  
Evolutionary simulations, 251
- Field-effect sensors, 429  
Fourier analysis of diffraction patterns, 139
- Synthesis, Properties, and Applications of Oxide Nanomaterials*, Edited by José A. Rodríguez and Marcos Fernández-García  
Copyright © 2007 John Wiley & Sons, Inc.

**716** INDEX

- Fourier transform infrared spectroscopy (FTIR), 312, 341  
Fuel cells, 651
- Gas sensors, 411  
Gas-solid transformations, 119  
Germanium oxide (GeO<sub>2</sub>), 128, 229  
Gold oxide (AuO<sub>x</sub>), 661
- Hartree-Fock method, 192  
High-gravity reactive precipitation, 92  
Hole creation, 454, 492  
Hole trapping, 493  
Hydrogen production, 651
- Immobilized photocatalytic systems, 505  
Impedance spectroscopy, 362, 457, 531  
Indium oxide (In<sub>2</sub>O<sub>3</sub>), 102  
INDO method, 230  
Industrial applications, 379  
Interfacial thermodynamics, 49  
*In-situ* powder diffraction, 141  
Ion conductor sensors, 428  
Ionic conduction, 356, 411, 428  
Iron oxide (FeO), 209, 275  
Iron oxide (Fe<sub>2</sub>O<sub>3</sub>), 51, 82, 100, 172, 209, 315, 344, 370, 401, 423, 495, 634  
Iron oxide (Fe<sub>3</sub>O<sub>4</sub>), 31, 51, 100, 209
- Lanthanum oxide (La<sub>2</sub>O<sub>3</sub>), 85, 424, 605  
Lead titanate (PbTiO<sub>3</sub>), 31, 127  
Lead oxide (PbO), 51, 128  
Lewis-Acid base reactions, 290  
Lithium manganate (LiMn<sub>2</sub>O<sub>4</sub>), 225  
Liquid-solid transformations, 81, 335  
Liquid-solid reactions, 81, 335
- Magnesium oxide (MgO), 51, 82, 128, 200, 222, 249, 267, 290, 313, 322, 335, 382, 424, 607, 634, 670  
Manganese oxide (Mn<sub>2</sub>O<sub>3</sub>), 102  
Manganese oxide (MnO), 209  
Manganese oxide (MnO<sub>2</sub>), 51, 209, 225, 253, 604  
Mechanical strength, 27  
Methane, 571, 613  
Metalorganic CVD, 120  
Microemulsion technique, 98  
MNDO method, 227  
Molecular dynamics simulations, 251  
Moller-Plesset perturbation theory, 193  
Molybdenum oxide (MoO<sub>3</sub>), 158, 176, 210, 321, 421, 619, 636
- Monte Carlo simulations, 251  
Morphological control, 68  
MSINDO method, 222
- Nickel oxide (NiO), 51, 82, 174, 209, 271, 312, 370, 392, 636, 670  
Niobium oxide (Nb<sub>2</sub>O<sub>5</sub>), 51  
N-containing bases, 316  
Nitrogen oxides (N<sub>2</sub>O, NO, NO<sub>2</sub>) reactions, 291, 312, 315, 438, 503  
NO<sub>x</sub> reduction reactions, 610  
Nucleation rate, 54
- Optical absorption, 170  
Organophosphorous compounds destruction, 394  
Orientation control, 68  
Oxygen handling, 353
- Parametric quantum methods, 217  
Particle stability, 49, 289, 337  
Perovskite oxides, 572, 579, 609  
Phonon confinement model, 148  
Photocatalysis, 491  
Photoelectronic devices, 451  
Photoemission, 174  
Photovoltaic devices, 451  
Physicochemical properties, 287  
Plasma assisted CVD, 121  
Platinum oxide (PtO), 300  
Platinum oxide (PtO<sub>2</sub>), 300  
PM3 method, 227  
Pollution control, 335, 381, 563  
Polymer electrolyte membrane fuel cell (PEMFC), 671  
Post Hartree-Fock methods, 193  
Potential assisted photocatalysis, 518  
Probe molecules, 311  
Pulsed laser deposition, 125
- Quantum confinement, 9  
Quantum-mechanics and bonding, 186  
Quantum Monte Carlo computations, 198
- Raman spectroscopy, 147, 318, 531  
Reactive pulsed laser deposition, 128  
Recrystallization of nanostructures, 271  
Rhenium oxide (ReO<sub>3</sub>), 83  
Ruthenium oxide (RuO<sub>2</sub>), 297
- Scanning transmission electron microscopy (STEM), 152

- Scanning tunneling microscopy, 156  
 Semi-empirical quantum-chemical methods, 217  
 Shape and size dependency, 21  
 Silica (SiO<sub>2</sub>), 51, 82, 124, 128, 140, 203, 231, 501  
 Sol-gel processing, 94  
 Solid oxide fuel cell, 674  
 Solvothermal technique, 101  
 Sonochemical coprecipitation, 91  
 Stability of oxide nanoparticles, 54, 289, 337  
 Steam reforming of hydrocarbons, 669  
 Strontium oxide (SrO), 271, 292, 382, 607, 634  
 Strontium titanate (SrTiO<sub>3</sub>), 131, 495, 580  
 Structural properties characterization, 137  
 Structural control, 67  
 Structure and bonding, 84  
 Sulfur dioxide (SO<sub>2</sub>) reactions, 290, 330, 383, 626, 633  
 Synthesis of oxide nanostructures, 79
- Technological applications, 379  
 Template/surface derivatized nanoparticles, 102  
 Terbium-doped ceria (Ce<sub>1-x</sub>Tb<sub>x</sub>O<sub>2</sub>), 374  
 Theory of size, 9  
 Thermally activated CVD, 120  
 Tight-binding method, 225  
 Tin oxide (SnO<sub>2</sub>), 32, 51, 148, 225, 416  
 Titania (TiO<sub>2</sub>), 31, 51, 82, 125, 146, 168, 172, 208, 223, 318, 335, 345, 423, 457, 493, 615, 636, 670, 685  
 Time-resolved powder diffraction, 141  
 Tracer diffusion, 365  
 Transmission electron microscopy (TEM), 152
- Transport properties, 353  
 Trapping of charge, 539  
 Tungsten oxide (WO<sub>3</sub>), 51, 82, 210, 422, 493, 619
- Valence photoemission, 175  
 Vanadium oxide (VO<sub>2</sub>), 208  
 Vanadium oxide (V<sub>2</sub>O<sub>5</sub>), 141, 208, 224, 371, 607, 636
- Wave functions, 186  
 Water-oxide interfacial tension, 57  
 Water-gas shift reaction, 654  
 Water: probe molecule, 316  
 Wave function-based computations, 191
- X-ray powder diffraction, 138, 529  
 X-ray absorption fine-structure (XAFS), 142  
 X-ray absorption near-edge structure (XANES), 167, 328
- Yttrium oxide (Y<sub>2</sub>O<sub>3</sub>), 51, 85, 146, 357, 423
- Zinc oxide (ZnO), 51, 82, 128, 146, 172, 313, 422, 481, 493, 636  
 Zirconium-doped ceria (Ce<sub>1-x</sub>Zr<sub>x</sub>O<sub>2</sub>), 141, 612, 634  
 Zirconium oxide (ZrO<sub>2</sub>), 38, 51, 82, 146, 206, 271, 368, 501, 615, 636, 670, 685  
 Zirconium titanate (ZrTiO<sub>3</sub>), 127

