Part I Understanding, Characterization and Synthesis of Modern Metal Oxide Nanomaterials

1 Insights into the Mechanism of Gas Sensor Operation ........ 3
Aleksander Gurlo

2 Surface Science Studies of Metal Oxide Gas Sensing Materials ................................ 35
Junguang Tao and Matthias Batzill

3 Design, Synthesis and Application of Metal Oxide-Based Sensing Elements: A Chemical Principles Approach .......... 69
Valery Krivetskiy, Marina Rumyantseva and Alexander Gaskov

4 Combinatorial Approaches for Synthesis of Metal Oxides: Processing and Sensing Application ........................... 117
Clemens J. Belle and Ulrich Simon

5 Selective Crystal Structure Synthesis and Sensing Dependencies ... 167
Lisheng Wang and Perena Gouma

6 Synthesis of Metal Oxide Nanomaterials for Chemical Sensors by Molecular Beam Epitaxy ................................. 189
Manjula I. Nandasiri, Satyanarayana V. N. T. Kuchibhatla and Suntharampillai Thevuthasan

7 Atomic Layer Deposition for Metal Oxide Nanomaterials ........ 225
Xiaohua Du
8 Microwave Synthesis of Metal Oxide Nanoparticles .......... 245
Natalie P. Herring, Asit B. Panda, Khaled AbouZeid,
Serial H. Almahoudi, Chelsea R. Olson, A. Patel and M. S. El-Shall

Part II  Novel Morphologies and Signal Transduction Principles
in Metal Oxide-Based Sensors

9 Metal Oxide Nanowires: Fundamentals
and Sensor Applications ........................................... 287
Zhiyong Fan and Jia G. Lu

10 ZnO Nanowires for Gas and Bio-Chemical Sensing .............. 321
Stephen J. Pearton, David P. Norton and Fan Ren

11 Metal Oxide Nanowire Sensors with Complex
Morphologies and Compositions ..................................... 345
Qiuhong Li, Lin Mei, Ming Zhuo, Ming Zhang and Taihong Wang

12 Optical Sensing Methods for Metal Oxide Nanomaterials ...... 365
Nicholas A. Joy and Michael A. Carpenter

Part III  New Device Architectures and Integration Challenges

13 Metal Oxide Nano-architectures and Heterostructures
for Chemical Sensors .................................................. 397
Thomas Fischer, Aadesh P. Singh, Trilok Singh,
Francisco Hernández-Ramírez, Daniel Prades and Sanjay Mathur

14 Evaluation of Metal Oxide Nanowire Materials
With Temperature-Controlled Microsensor Substrates ............. 439
Kurt D. Benkstein, Baranidharan Raman, David L. Lahr
and Steven Semancik

15 Multisensor Micro-Arrays Based on Metal Oxide Nanowires
for Electronic Nose Applications .................................... 465
Victor V. Sysoev, Evgheni Strelcov and Andrei Kolmakov

16 Microhotplates and Integration with Metal-Oxide
Nanomaterials .......................................................... 503
Emanuele Barborini

Concluding Remarks and Outlook ..................................... 539

Index ........................................................................... 543
Metal Oxide Nanomaterials for Chemical Sensors
Carpenter, M.A.; Mathur, S.; Kolmakov, A. (Eds.)
2013, XX, 548 p., Hardcover