

# Table of Contents

## Preface

## Chapter 1: Photocatalytic Materials

|                                                                                                                                                                        |    |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Z-Scheme over all Water Splitting on Rh/K<sub>4</sub>Nb<sub>6</sub>O<sub>17</sub> Nanosheets Photocatalyst</b><br>H.Y. Lin and Y.L. Ye                              | 3  |
| <b>Bismuth Vanadate-Based Photoelectrodes for Photoelectrochemical Water Splitting: Synthesis and Characterisation</b><br>C.S. Yaw, M.N. Chong and A.K. Soh            | 9  |
| <b>Grafting of TiO<sub>2</sub> on PMMA Film and Reusability in Photodegradation of Organic Dye</b><br>R. Klaysri, S. Wichaidit, P. Praserttham and O. Mekasuwandumrong | 17 |
| <b>Photocatalytic Activation of TiO<sub>2</sub> Biomaterials by UV and X-Rays</b><br>K.H. Cheung, P. Koshy, M.B. Pabbuwe, B. Lee and C.C. Sorrell                      | 22 |

## Chapter 2: Nanomaterials for Solid State Gas Sensors

|                                                                                                                                                                                                                                         |    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Investigating the Selective Behaviour of CuO in Gas Sensing Applications</b><br>S. Palzer, J. Wöllenstein and J. Kneer                                                                                                               | 33 |
| <b>Sensitivity and Selectivity of SnO<sub>2</sub>-Based Sensor for CO and H<sub>2</sub> Detections: A Novel Method to Detect Simultaneously the CO and H<sub>2</sub> Concentrations</b><br>X.M. Guo, J.T. Zhao, X.T. Yin and S.L. Huang | 40 |
| <b>Enhanced Gas Sensing Properties of Different ZnO 3D Hierarchical Structures</b><br>A. Fioravanti, A. Bonanno, M. Mazzocchi, M.C. Carotta and M. Sacerdoti                                                                            | 48 |
| <b>Green Synthesis of Biopolymer-Silver Nanocomposites for Gas Sensing</b><br>S.A. Pande                                                                                                                                                | 54 |
| <b>Sensing Properties of Diode-Type Gas Sensors</b><br>Y. Shimizu and T. Hyodo                                                                                                                                                          | 61 |

## Chapter 3: Non-Volatile Memory Devices

|                                                                                                                                                                                                         |    |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| <b>Potential Fluctuation in RRAM Based on Non-Stoichiometric Hafnium Sub-Oxides</b><br>D.R. Islamov, V.N. Kruchinin, V.S. Aliev, T.V. Perevalov, V.A. Gritsenko, I.P. Prosvirin, O.M. Orlov and A. Chin | 69 |
| <b>The Resistive Switching Behavior of ZnO Films Depending on Li Dopant Concentration and Electrode Materials</b><br>A. Igityan, Y. Kafadaryan, N. Aghamalyan and S. Petrosyan                          | 75 |
| <b>Integrating MTJ Devices into a 130nm CMOS Process Flow</b><br>M. Buchbinder, O. Eli, S. Rozental, Y. Bouhnik, S. Greenberg, K. Mani, Y. Cohen, K. Mackay, J. Pereira and J.A. Herault                | 81 |
| <b>Toward Sub-20 nm Magnetic Tunnel Junction for Embedded Cache Memory</b><br>T. Sugii, H. Noshiro, Y. Yamazaki, C. Yoshida and Y. Iba                                                                  | 90 |
| <b>Memory Loss in a Tantalum Oxide Memristor</b><br>A. Ascoli, R. Tetzlaff, L.O. Chua, J.P. Strachan and R.S. Williams                                                                                  | 94 |