

Table of Contents

Preface

Chapter 1: Synthesis and Applications of Nanomaterials

Synthesis and Characterization of Silver Nanoparticles Prepared from Pomegranate Peel Extracts and its Antibacterial Activity N.A. Sobhy, H.M. Ahmed and M.A. El-Khateeb	3
Preparation and Characterization of Iron Nanoparticles by Green Synthesis Method and its Application in Water Treatment H.M. Ahmed, N.A. Sobhy, M.A. El-Khateeb, M.M. Hefny and F.M. Abdel-Haleem	11
Green Biosynthesis of Zinc Oxide Nanoparticles Utilizing Pomegranate Peel Extract for Grey Water Treatment H.M. Ahmed, N.A. Sobhy, W.A. Ibrahim and M.E. Fawzy	27
Design and Implementation of Montmorillonite Clay-Based Catalyst for Carbon Nanotube Synthesizing M. Morsy, H. Shoukry, M. Garieb, A. El-Nagar, W.M. Taha and M.M. Mokhtar	37
Heptachlor Epoxide -Pesticide- Removal from Aqueous Solutions Using Nano Zero Valen t Iron: Operating Conditions, Response Surface Methodology, and Artificial Intelligence Neural Networks N.Y. Mohamed and A.S. Mahmoud	51

Chapter 2: Semiconductor Wafer Fabrication

High-Speed Plasma Etching of Gallium Oxide Substrates Using Atmospheric-Pressure Plasma with Hydrogen-Helium Mixed Gas Y. Sano, T. Sai, G. Nakaue, D. Toh and K. Yamauchi	69
Transport Phenomena during Liquid Si-Induced 4H-SiC Surface Structuring in a Sandwich Configuration Y. Joussemae, F. Cauwet and G. Ferro	73
Surface-Localized 15R Formation on 4H-SiC (0001) Si-Face by Laser Annealing for Power N-Type MOSFETs F. Rozé, T. Tabata, S. Kerdilès, L. M. Rubin, P. Raynal, P. Acosta-Alba, D. Roh, M. Opprecht and F. Mazzamuto	79
Exploring UV-Laser Effects on Al-Implanted 4H-SiC M. Vivona, F. Giannazzo, G. Bellocchi, S. Panasci, S. Agnello, P. Badalà, A. Bassi, C. Bongiorno, S. Di Franco, S. Rascunà and F. Roccaforte	85
Benchmarking Experiment of Substrate Quality including SmartSiC™ Wafers by Epitaxy in a Batch Reactor B. Kallinger, P. Hens, C. Kranert, K.M. Albrecht and J. Erlekampf	91
Optimizing Non-Contact Doping and Electrical Defect Metrology for Production of SiC Epitaxial Wafers V. Pushkarev, T. Rana, M. Gave, E. Sanchez, A. Savtchouk, M. Wilson, D. Marinskiy and J. Lagowski	99
Quality Evaluation of 150 mm 4H-SiC Grown at over 1.5 mm/h by High-Temperature Chemical Vapor Deposition Method T. Okamoto, H. Uehigashi, T. Kanda, N. Ohya, A. Horiai, S. Sakakibara, T. Kanemura, K. Betsuyaku, N. Hoshino, I. Kamata and H. Tsuchida	105
Deep Level Reduction in 4H-SiC Treated by Plasma Immersion G. Alfieri and L. Knoll	113
Improving the Polishing Speed and Surface Quality of 4H-SiC Wafers with an MnO₂- Based Slurry T. Nakamura, A. Kumagai, Y. Saruwatari and S. Hara	119

Chapter 3: Coatings and Tribology

Preparation, Characterization and Tribological Performance of Polyurethane (PU)

Coatings Filled with Graphene Oxide (GO)

L.H. Kong, L. Zhang, G.X. Li, D. Liu and J.L. Niu

127

Brush Plating of Ag-Bi Coatings from a Cyanide-Free Solution

B.S. Du, Z.W. Zhang, S. Suo and X.M. Li

133

Effect of Alternate Cycle Temperature on the Tribological Performance of Polyimide Composites

Y. Wang, X.H. Gao, Z.C. Wu, X.L. Zhang, F.B. Li, G.S. Wang, Z.Q. Li, Y.Z. Yue, P. Li, Y.M. Wang and J.X. Hou

139