

Handbook of Graphene

Volumes 1-8

Editors:

Edvige Celasco, Department of Physics, University of Genoa, Italy

Alexander N. Chaika, Institute of Solid State Physics, Russian Academy of Sciences, Russia

Tobias Stauber, Institute of Materials Science, Spanish National Research Council, Spain

Mei Zhang, High-Performance Materials Institute, Florida State University, USA

Cengiz Ozkan, Department of Materials Science & Engineering, University of California, USA

Umit Ozkan, Chemical and Biomolecular Engineering, Ohio State University, USA

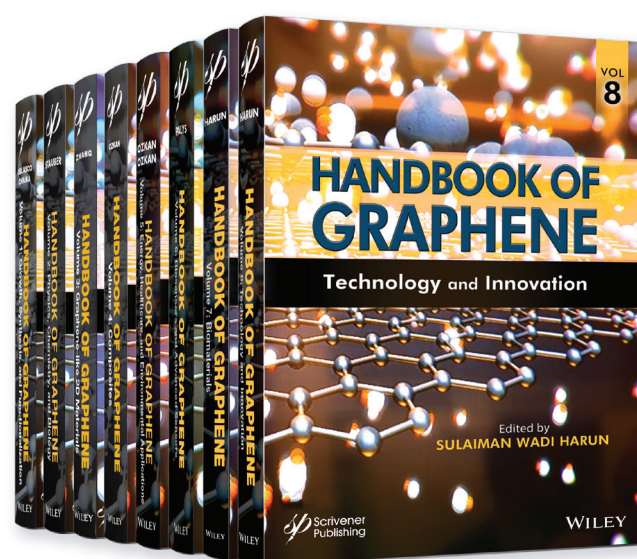
Barbara Palys, University of Warsaw, Poland

Sulaiman Wadi Harun, Department of Electrical Engineering, University of Malaysia

Engineering/ Material Science/ Nanomaterials

Despite being just a one-atom-thick sheet of carbon, graphene is one of the most valuable nanomaterials. Since its discovery in 2004, given its novel traits, graphene has attracted attention for use in cutting-edge applications in almost every area of technology, which are projected to change the world.

The Handbook of Graphene comprises a set of 8 individual volumes, in 140 chapters from world renowned experts, that brings an interdisciplinary perspective to accomplish a more detailed understanding of the interplay between the synthesis, structure, characterization, processing, applications and performance of the advanced materials.



8 Volumes Set | Print ISBN 9781119459903
Hardcover | 4746 pages
June 2019 | List price US\$2,199.95
Online ISBN 9781119468455

Volume 1: Growth, Synthesis, and Functionalization

Print ISBN: 9781119468554

Volume 2: Physics, Chemistry, and Biology

Print ISBN: 9781119469599

Volume 3: Graphene-like 2D Materials

Print ISBN: 9781119469650

Volume 4: Composites

Print ISBN: 9781119469681

Volume 5: Energy, Healthcare, and Environmental Applications

Print ISBN: 9781119469711

Volume 6: Biosensors and Advanced Sensors

Print ISBN: 9781119469742

Volume 7: Biomaterials

Print ISBN: 9781119469773

Volume 8: Technology and Innovation

Print ISBN: 9781119469803

Readership:

Researchers and graduate students in the field of advanced materials and graphene, materials scientists, chemists and physicists, entrepreneurs and industrialists.



Please contact your local Wiley sales representative to place your orders or for any queries.

(information is accurate as of July 2019)

SP
Scrivener
Publishing

WILEY

Handbook of Graphene, Volumes 1-8

ABOUT THE EDITORS:

Edvige Celasco is an Associate Professor in the Physics Department at the University of Genoa, Italy, after gaining her PhD in Physics at the Polytechnic in Turin in 2016. Her current research focuses on studying reactivity of graphene with HREELS and XPS. She is the author or co-author of more than 50 papers in international peer-reviewed journals and about 50 conference proceedings.

Alexander N. Chaika is currently a Senior Research Scientist in the Laboratory of Semiconductor Surfaces Spectroscopy, Institute of Solid State Physics, Russian Academy of Sciences, Chernogolovka, Russia. He received MSc and PhD degrees in Physics from Moscow State University, Russia. He is the recipient of the International Marie Curie Award (2012) and has published more than 60 papers in international peer-reviewed journals.

Tobias Stauber obtained his PhD in Theoretical Physics from the University of Heidelberg, Germany in 2002 in the group of Prof. F. Wegner on "Flow Equations for Hamiltonians". He then continued with his postdoctoral studies at the Material Science Institute of Madrid (ICMM) of the Spanish National Research Council (CSIC), Spain with Prof. F. Guinea on studies related to graphene. Since 2014, he is a tenured scientist at the ICMM, CSIC in Madrid. He is the co-author of 74 ISI-classified articles, including 2 articles published in Science with more than 7,800 citations and h-factor 28, and the co-editor for New Journal of Physics and European Physical Journal B.

Mei Zhang obtained her PhD in Engineering and Materials Science from Osaka Prefecture University, Japan in 1995. She is now a Professor in the Industrial and Manufacturing Engineering Department at Florida State University, Tallahassee, USA. Professor Zhang has more than 80 SCI publications and about 17 patents either granted or pending.

Cengiz Ozkan obtained his PhD in Materials Science from Stanford University in 1997 and he is now a Professor at the Department of Materials Science & Engineering, University California Riverside, USA. He has several US patents, over 40 patent disclosures and more than 100 technical publications. His awards include the FCRP/GRC Inventor Recognition Award, the TASSA Research Award and the Achievement in Technical Ingenuity Award.

Umit Ozkan obtained her PhD from Iowa State University in 1984. She is COE Distinguished Professor, Chemical & Biomolecular Engineering at Ohio State University, USA. She has published more than 200 articles in SCI journals, 6 patents, and co-edited at least 4 books. Her principal research interests are Heterogeneous Catalysis, Electrocatalysis and Catalytic Materials; Sustainability, Energy, Environment.

Barbara Palys received her PhD (1993) from University of Twente, the Netherlands and DSc (2008) from University of Warsaw, Poland. She is currently professor at the Faculty of Chemistry at the University of Warsaw and leader of the group "Materials for Biosensors" at the Biological and Chemical Research Centre. She has authored more than 70 publications cited over 1,300 times (h-factor=21).

Sulaiman Wadi Harun received his MSc. and PhD degrees in Photonics Technology from the University of Malaya in 2001 and 2004, respectively. He is now a full professor at the Department of Electrical Engineering, University of Malaya, and has nearly 20 years of research experience in the development of optic fiber devices. Professor Harun has published more than 700 articles in ISI Journals and has received the prestigious award of Malaysian Rising Star 2016 from the Ministry of Higher Education for his contribution in international collaboration.

TABLE OF CONTENTS:

Volume 1: Growth, Synthesis, and Functionalization

Edited by Edvige Celasco

1.Graphite in Metallic Materials Growths, Structures, and Defects of Spheroidal Graphite in Ductile Iron

Jingjing Qing and Mingzhi Xu
Georgia Southern University, USA

2.Graphene—Synthesis and Quality Optimization

Dinh-Tuan Nguyen, Ya-Ping Hsieh and Mario Hofmann
Academia Sinica, Taiwan

3.Methods of Synthesis and Physicochemical Properties of Fluorographenes

Natalia Lvova and Michail Annenkov
Technological Institute for Superhard and Novel Carbon Materials, Russia

Moscow Institute of Physics and Technology, Russia

National University of Science and Technology MISIS, Russia

4.Graphene-SiC Reinforced Hybrid Composite Foam: Response to High Strain Rate Deformation

Sourav Das
University of Missouri, USA

5.Atomic Structure and Electronic Properties of Few-Layer Graphene on SiC(001)

Alexander N. Chaika, Victor Y. Aristov and Olga V. Molodtsova

Institute of Solid State Physics of the Russian Academy of Sciences, Russia

Deutsches Elektronen-Synchrotron DESY, Germany

ITMO University, Russia

6.Features and Prospects for Epitaxial Graphene on SiC

Wataru Norimatsu, Tomo-o Terasawa, Keita Matsuda, Jianfeng Bao and Michiko Kusunoki

Nagoya University, Japan

Inner Mongolia University for Nationalities, China

7.Graphitic Carbon/Graphene on Si(111) via Direct Deposition of Solid-State Carbon Atoms: Growth Mechanism and Film Characterization

Trung T. Pham and Robert Sporken

University of Namur, Belgium

HCMC University of Technology and Education, Vietnam

R&D Center - Saigon High-Tech Park, Vietnam

8.Chemical Reactivity and Variation in Electronical

Properties of Graphene on Ni(111) and Reduced Graphene Oxide

Edvige Celasco

Università di Genova, Italy

IMEM-CNR Unità Operativa di Genova, Italy

9.Chlorophyll and Graphene: A New Paradigm of Biomimetic Symphony

Jhimli Sarkar Manna and Debmalhya Das

Indian Institute of Technology, India

Indian Association for the Cultivation of Science, India

10.Graphene Structures: From Preparations to Applications

Yuliana Elizabeth Avila Alvarado, María Teresa Romero de la Cruz, Heriberto Hernandez-Cocolezzi

and Gregorio H. Cocoletzi

Universidad Autónoma de Coahuila, México

Benemérita Universidad Autónoma de Puebla, México

11. Three-Dimensional Graphene-Based Structures: Production Methods, Properties, and Applications

Leila Haghighi Poudeh, Mehmet Yildiz, Yusuf Menciloglu and Burcu Saner Okan

Sabancı University, Turkey

Sabancı University Integrated Manufacturing Technologies Research and Application Center & Composite Technologies Center of Excellence, Turkey

12. Electrochemistry of Graphene Materials

Wei Sun and Lu Wang
University of Toronto, Canada

13. Hydrogen Functionalized Graphene Nanostructure Material for Spintronic Application

Sekhar Chandra Ray
University of South Africa, South Africa

14. The Impact of Uniaxial Strain and Defect Pattern on Magnetoelectronic and Transport Properties of Graphene

Taras M. Radchenko, Ihor Y. Sahalianov, Valentyn A. Tatarenko, Yuriy I. Prylutsky, Paweł Szroeder, Mateusz Kempiński and Wojciech Kempiński

National Academy of Sciences of Ukraine, Ukraine

Taras Shevchenko National University of Kyiv, Ukraine

Kazimierz Wielki University, Poland

Adam Mickiewicz University, Poland

Polish Academy of Sciences, Poland

15. Exploiting Graphene as an Efficient Catalytic Template for Organic Transformations: Synthesis, Characterization and Activity Evaluation of Graphene-Based Catalysts

Anastasios Stergiou
National Hellenic Research Foundation, Greece

16. Exfoliated Graphene-Based 2D Materials: Synthesis and Catalytic Behaviors

Esmail Doustkhah, Mustafa Farajzadeh, Hamed Mohtasham, Junais Habeeb and

Sadegh Rostamnia

National Institute for Materials Science (NIMS), Japan

University of Maragheh, Iran

Chalmers University of Technology, Sweden

17. Functionalization of Graphene with Molecules and/or Nanoparticles for Advanced Applications

Andrea Maio, Roberto Scaffaro, Alessio Riccobono and Ivana Pibiri
University of Palermo, Italy

18. Carbon Allotropes, Between Diamond and Graphite: How to Create Semiconductor Properties in Graphene and Related Structures

V. Lytovchenko, A. Kurchak, S. Repetsky and M. Strikha
V. Lashkarev Institute of Semiconductor Physics NAS Ukraine, Ukraine

Volume 2: Physics, Chemistry, and Biology

Edited by Tobias Stauber

1. Topological Design of Graphene

Bo Ni, Teng Zhang, Jiaoyan Li, Xiaoyan Li and Huajian Gao

Brown University, USA

Syracuse University, USA

Tsinghua University, China

2. Graphene at the Metal–Oxide Interface: A New Approach to Modify the Chemistry of Supported Metals

Wen Luo and Spyridon Zafeirotos

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

CNRS-Université de Strasbourg, France

3. The Combinatorial Structure of Graphene

J.E. Graver and E.J. Hartung

Massachusetts College of Liberal Arts, USA

Syracuse University, USA

4. Interacting Electrons in Graphene

T. Stauber, P. Parida, M. Trushin, M. V. Ulybyshev, D. L. Boyda and J. Schliemann

Instituto de Ciencia de Materiales de Madrid, Spain

Central University of Punjab, India

National University of Singapore, Singapore

University of Regensburg, Germany

Far Eastern Federal University, Russia

ITEP, B., Russia

5. Computational Determination of the Properties of Graphene Nanoribbons

Frank J. Owens
City University of New York, USA

6. Synthetic Electric Fields Influence the Non-Stationary Processes in Graphene

N.E. Firsova and Yu. A. Firsov

Russian Academy of Sciences, Russia

St. Petersburg Polytechnic University, Russia

7. Interaction and Manipulation of Bi Adatoms on Monolayer Epitaxial Graphene

Shu Hsuan Su, Shih Yang Lin, Jung Chun Andrew Huang and Min Fa Lin

National Cheng Kung University, Taiwan (R.O.C.)

Taiwan Consortium of Emergent Crystalline Materials, Ministry of Science and Technology, Taiwan (R.O.C.)

8. Strain Engineering: Electromechanical Properties of Graphene

Shuze Zhu
Massachusetts Institute of Technology, USA

9. Characteristic Mechanical Responses of Graphene Membranes

Young In Jhon
Korea Institute of Science and Technology, Republic of Korea

10. Graphene and Its Derivatives as Platforms for MALDI-MS

Hani Nasser Abdelhamid and Hui-Fen Wu

Assiut University, Egypt

National Sun Yat-Sen University, Taiwan

Kaohsiung Medical University, Taiwan

Academia Sinica, Taiwan

11. Characterization and Dynamic Manipulation of Graphene by In Situ Transmission Electron Microscopy at Atomic Scale

Chaolun Wang, Chen Luo and Xing Wu
East China Normal University, China

12. Peculiarities of Quasi-Particle Spectra in Graphene Nanostructures

E.S. Syrkin, V.A. Sirenko, S.B. Feodosyev, I.A. Gospodarev

and K.A. Minakova

Verkin Institute for Low Temperature Physics and Engineering, Ukraine

National Technical University “Kharkiv Polytechnic Institute”, Ukraine

13. Complex Refractive Index (RI) of Graphene

Sosan Cheon and Kenneth David Kihm

Seoul National University, Republic of Korea

University of Tennessee, USA

14. Fractional Quantum Hall Effect in Graphene, a Topological Approach

Janusz E. Jacak
University of Science and Technology, Poland

15. Graphene Plasmonic: Switching Applications 455

Ali Farmani
Department of Electronic Engineering, Khorram abbad, Iran

16. Theoretical Study and Numerical Modeling of Graphene's Electromagnetic Response

Amanatiadis Stamatios and Kantartzis Nikolaos
Aristotle University of Thessaloniki, Greece

17. Graphene-Like $A_N B_{8-N}$ Compounds on Metals and Semiconductors

Sergei Yu. Davydov
Russian Academy of Sciences, Russia

18. Lower Dimensional Materials

B.G. Sidharth

International Institute for Applicable Mathematics and Informatics, India, and Udine, Italy

B.M. Birla Science Centre, India

19. Nature of Graphene, Its Chemical Structure, Composites, Synthesis, Properties, and Applications

Samuel Eshorame Sanni, Oluranti Agboola, Rotimi Emmanuel Sadiku and Moses Eterigho Emetere

Covenant University, Nigeria

Tshwane University of Technology, South Africa

University of Johannesburg, South Africa

Handbook of Graphene

Volumes 1-8

20. Graphene-Based Nanomaterials in Tissue Engineering and Regenerative Medicine

Sorour Darvishi, Samad Ahadian and Houman Savoji

École Polytechnique Fédérale de Lausanne (EPFL), Switzerland

University Health Network, Canada

University of Toronto, Canada

Volume 3: Graphene-like 2D Materials

Edited by Mei Zhang

1. Proximity-Induced Topological Transition and Strain-Induced Charge Transfer in Graphene/MoS₂ Bilayer Heterostructures

Sobhit Singh, Abdulrhman M. Alsharari, Sergio E. Ulloa and Aldo H. Romero

West Virginia University, USA

Ohio University, USA

2. Planar Graphene Superlattices

Pavel V. Ratnikov
Russian Academy of Sciences, Russia

3. Magnetic and Optical Properties of Graphene Materials with Porous Defects

Masashi Hatanaka
Tokyo Denki University, Japan

4. Graphynes: Advanced Carbon Materials with Layered Structure

Evgeny Belenkov, Maria Brzhezinskaya and Viktor Mavrinskii

Chelyabinsk State University, Russia

Helmholtz-Zentrum Berlin für Materialien und Energie, Germany

Nosov Magnitogorsk State Technical University, Russia

5. Nanoelectronic Application of Graphyne and Its Structural Derivatives

Barnali Bhattacharya, N. Bedamani Singh and Utpal Sarkar

Assam University, India

Nagaland University, India

6. 6 Twisted Bilayer Graphene: Low-Energy Physics, Electronic and Optical Properties

Gonçalo Catarina, Bruno Amorim, Eduardo V. Castro, João M. V. P. Lopes and Nuno Peres

QuantaLab, International Iberian Nanotechnology Laboratory (INL), Portugal

Universidade de Lisboa, Portugal

Beijing Computational Science Research Center, China

Universidade do Porto, Portugal

University of Minho, Portugal

7. Effects of Charged Coulomb Impurities on Low-Lying Energy Spectra in Graphene Magnetic Dot and Ring

C. M. Lee
City University of Hong Kong, Hong Kong, People's Republic of China

8. Graphene in Bioelectronics

B. K. Sahoo and S. Sahoo

National Institute of Technology, Chhattisgarh, India

National Institute of Technology, West Bengal, India

9. Graphene Metamaterial Electron Optics: Excitation Processes and Electro-Optical Modulation

A.D. Boardman, Yu. G. Rapoport, D.E. Aznakayeva, E.G. Aznakayev and V. Grimalsky

University of Salford, UK

National Taras Shevchenko University of Kiev, Ukraine

The University of Manchester, UK

National Aviation University, Ukraine

Autonomous University of Morelos, Mexico

10. Linear Carbon: From 1D Carbyne to 2D Hybrid sp² Nanostructures Beyond Graphene

A. Milani, A. Li Bassi, V. Russo, M. Tommasini and C.S. Casari
Politecnico di Milano, Italy

11. Band Structure Modifications in Beyond Graphene Materials

Abdul Majid, Alia Jabeen and Amber Batool
University of Gujrat, Pakistan

12. Chemically Modified 2D Materials: Production and Applications

Izcoatl Saucedo-Orozco and Mildred Quintana
Universidad Autónoma de San Luis Potosí, México

13. Black Phosphorus Saturable Absorber for Passive Mode-Locking Pulses Generation

Anas Abdul Latiff, Sulaiman Wadi Harun, Muhammad Farid Mohd Rusdi and Harith Ahmad

Universiti Teknikal Malaysia Melaka, Malaysia

University of Malaya, Malaysia

14. Search for Fundamental Physics on Table Top Experiments with Dirac-Weyl Materials

Ana Julia Mizher, Alfredo Raya and Cristian Villavicencio

Katholieke Universiteit Leuven Kulak, Belgium

Universidade Estadual Paulista, Brazil

Universidad Michoacana de San Nicolas de Hidalgo, Ciudad Universitaria, Mexico

Universidad del Bío-Bío, Chile

Volume 4: Composites

Edited by Cengiz Ozkan

1. Graphene Composites

Xiao-Jun Shen, Xiao-Ling Zeng and Chen-Yang Dang

Jiaxing University, China

2. Graphene-Reinforced Advanced Composite Materials

Xiaochao Ji, Shaojun Qi, Rajib Ahmed and Ahmmed A. Rifat

University of Birmingham, UK

The Australian National University, Australia

3. Graphene-Based Composite Materials

Munirah Abdullah Almessiere, Kashif Chaudhary, Jalil Ali and Muhammad Sufi Roslan

Imam Abdulrahman Bin Faisal University, Saudi Arabia

Ibnu Sina Institute for Scientific & Industrial Research, Universiti Teknologi Malaysia (UTM), Malaysia

Universiti Tun Hussein Onn Malaysia (UTHM), Malaysia

4. Interfacial Mechanical Properties of Graphene/ Substrate System: Measurement Methods and Experimental Analysis

Chaochen Xu, Hongzhi Du, Yilan Kang and Wei Qiu
Tianjin University, People's Republic of China

5. Graphene-Based Ceramic Composites: Processing and Applications

Kalaimani Markandan and Jit Kai Chin

University of Nottingham Malaysia Campus, Malaysia

University of Huddersfield, UK

6. Ab Initio Design of 2D and 3D Graphene-Based Nanostructure

Andrei Timoshevskii, Sergiy Kotrechko, Yuriy Matviychuk

and Eugene Kolyvoshko

G.V. Kurdyumov Institute for Metal Physics, Ukraine

Taras Shevchenko Kyiv National University, Ukraine

7. 7 Graphene-Based Composite Nanostructures: Synthesis, Properties, and Applications

Mashkoor Ahmad and Saira Naz

Pakistan Institute of Nuclear Science and Technology (PINSTECH), Pakistan

University of Peshawar, Pakistan

8. Graphene-Based Composites with Shape Memory Effect—Properties, Applications, and Future Perspectives

André Espinha, Ana Domínguez-Bajo, Ankor González-Mayorga and María Concepción Serrano

Universidad Autónoma de Madrid, Spain

Consejo Superior de Investigaciones Científicas, Spain

Hospital Nacional de Paraplégicos, Spain

9. Graphene-Based Scroll Structures: Optical Characterization and Its Application in Resistive Switching Memory Devices

Janardhanan R. Rani and Jae-Hyung Jang
Gwangju Institute of Science and Technology, South Korea

10. Fabrication and Properties of Copper-Graphene Composites

Vladimir G. Konakov, Ivan Yu. Archakov and Olga Yu. Kurapova

St. Petersburg State University, Russia

Peter the Great St. Petersburg Polytechnic University, Russia

Russian Academy of Sciences, Russia

11. Graphene-Metal Oxide Composite as Anode Material in Li-Ion Batteries

Sanjaya Brahma, Shao-Chieh Weng and Jow-Lay Huang
National Cheng Kung University, Taiwan (R.O.C.)

12. Graphene/TiO₂ Nanocomposites: Synthesis Routes, Characterization, and Solar Cell Applications

Chin Wei Lai, Foo Wah Low, Siti Zubaidah Binti Mohamed Siddick and Joon Ching Juan
Nanotechnology & Catalysis Research Centre, University of Malaya (UM), Malaysia

13. Role of Reduced Graphene Oxide Nanosheet Composition with ZnO Nanostructures in Gas Sensing Properties

A.S.M. Iftekhar Uddin
and Hyeon Cheol Kim

Metropolitan University,
Bangladesh

University of Ulsan, Republic of
Korea

14. Functional Graphene Oxide/Epoxy Nanocomposite Coatings with Enhanced Protection Properties

H. Alhumade, R.P. Nogueira, A. Yu,
L. Simon and A. Elkamel

University of Waterloo, Canada

Khalifa University, UAE

King Fahd University of Petroleum
and Minerals (KFUPM), Saudi
Arabia

15. Supramolecular Graphene-Based Systems for Drug Delivery

Sandra M.A. Cruz,
Paula A.A.P. Marques
and Artur J.M. Valente

TEMA, University of Aveiro, Portugal

CQC, University of Coimbra,
Portugal

16. Polymeric Nanocomposites Including Graphene Nanoplatelets

Ismaeil Ghasemi
and Sepideh Gomari
Iran Polymer and Petrochemical
Institute, Iran

17. Graphene Oxide–Polyacrylamide Composites: Optical and Mechanical Characterizations

Gülşen Akin Evingür
and Önder Pekcan

Piri Reis University, Turkey

Kadir Has University, Turkey

18. Synthesis, Characterization, and Applications of Polymer/Graphene Oxide Composite Materials

Carmina Menchaca-Campos,
César García-Pérez,
Miriam Flores-Domínguez,
Miguel A. García-Sánchez,
M.A. Hernández-Gallegos,
Alba Covelo and
Jorge Uruchurtu-Chavarín

Centro de Investigación en
Ingeniería y Ciencias Aplicadas,
IICBA-UAEM, México

Universidad Autónoma
Metropolitana-Iztapalapa, México

Centro de Ingeniería de
Superficies y Acabados, UNAM,
México

Volume 5: Graphene in Energy, Healthcare, and Environmental Applications

Edited by Cengiz Ozkan
& Umit S. Ozkan

1. Graphene Nanomaterials in Energy and Environment Applications

Mingqing Yang, Hua Tian, Jiayi Zhu
and Junhui He

Chinese Academy of Sciences
(CAS), China

2. Graphene as Nanolubricant for Machining

Aakash Niraula, Ashutosh Khatri
and Muhammad P. Jahan
Miami University, USA

3. Three-Dimensional Graphene Foams for Energy Storage Applications

Fancheng Meng, Xiangfeng Wei
and Jiehua Liu
Hefei University of Technology,
China

4. Three-Dimensional Graphene Materials: Synthesis and Applications in Electrocatalysts and Electrochemical Sensors

Chunmei Zhang and Wei Chen
Chinese Academy of Sciences, China
University of Chinese Academy of
Sciences, China

5. Graphene and Graphene-Based Hybrid Composites for Advanced Rechargeable Battery Electrodes

Hee Jo Song and Dong-Wan Kim
Korea University, South Korea

6. Graphene-Based Materials for Advanced Lithium-Ion Batteries

Ran Tian and Huanan Duan
Shanghai Jiao Tong University,
People's Republic of China

7. Graphene-Based Materials for Supercapacitors and Conductive Additives of Lithium Ion Batteries

Qian Cheng
IoT Devices Research Laboratories,
NEC Corporation, Japan

8. Graphene-Based Flexible Actuators, Sensors, and Supercapacitors

Chao Lu and Wei Chen
The Hong Kong Polytechnic
University, Hong Kong, PR China
Chinese Academy of Sciences, PR
China

9. Graphene as Catalyst Support for the Reactions in Fuel Cells

S. I. Stevanović and V. M. Jovanović
University of Belgrade, Serbia

10. Nitrogen-Doped Carbon Nanostructures as Oxygen Reduction Reaction (ORR) and Oxygen Evolution Reaction (OER) Electrocatalysts in Acidic Media

Kuldeep Mamtani and Umit S. Ozkan
The Ohio State University, USA

11. Recent Advances in Graphene-Based Materials for Photocatalytic H₂ Evolution

Min Li, Lu Bai, Xudong Wen
and Jingqi Guan
Jilin University, PR China

12. Graphene Thermal Functional Device and Its Property Characterization

Haidong Wang, Hiroshi Takamatsu
and Xing Zhang
Tsinghua University, China
Kyushu University, Japan

13. Self- and Directed-Assembly of Metallic and Nonmetallic Fluorophors: Considerations into Graphene and Graphene Oxides for Sensing and Imaging Applications

David G. Calatayud,
Fernando Cortezon-Tamarit,
Boyang Mao, Vincenzo Mirabello
and Sofia I. Pascu

Instituto de Ceramica y Vidrio-
CSIC, Spain

University of Bath, United Kingdom

The University of Manchester,
United Kingdom

14. Stimuli-Responsive Graphene-Based Matrices for Smart Therapeutics

Sabine Szunerits, Alina Vasilescu,
Valentina Dinca, Serban Petcu and
Rabah Boukherroub

Univ. Lille, CNRS, Centrale Lille,
ISEN, Univ. Valenciennes, France

International Centre of
Biodynamics, Romania

National Institute for Laser,
Plasma and Radiation Physics,
Romania

Michigan State University, USA

15. Application of Graphene Materials in Molecular Diagnostics

Foad Salehnia, Neda Fakhri,
Morteza Hosseini and
Mohammad Reza Ganjali

University of Tehran, Iran

Tehran University of Medical
Sciences, Iran

16. Graphene Oxide Membranes for Liquid Separation

Zhiqian Jia
Beijing Normal University, PR
China

Volume 6: Biosensors and Advanced Sensors

Edited by Barbara Palys

Section 1: Biosensors

1. Graphene-Based Biosensors: Fundamental Concepts, Outline of Utility, and Future Scopes

Soumya Kar and
Prashant K. Sarswat
University of Utah, USA

2. Graphene for Electrochemical Biosensors in Biomedical Applications

Haiyun Liu and Jinghua Yu
University of Jinan, China

3. Graphene-Based Biosensors in Agro-Defense: Food Safety and Animal Health Diagnosis

Rohit Chand, Satish K. Tuteja
and Suresh Neethirajan
University of Guelph, Canada

4. Trends and Frontiers in Graphene-Based (Bio)sensors for Pesticides Electroanalysis

Camila P. Sousa,
Francisco W. P. Ribeiro,
Thiago M. B. F. Oliveira,
Adriana N. Correia,
Pedro de Lima-Neto
and Simone Morais

Universidade Federal do Ceará,
Brazil

Universidade Federal do Cariri,
Brazil

REQUIMTE-LAQV, Instituto
Politécnico do Porto, Portugal

5. Graphene-Based Biosensors: Design, Construction, and Validation. Toward a Nanotechnological Tool for the Rapid in-Field Detection of Food Toxicants and Environmental Pollutants

Christina G. Siontorou,
Georgia-Paraskevi Nikoleli,
Dimitrios P. Nikolelis,
Stephanos Karapetis
and Marianna-Thalia Nikolelis

University of Piraeus, Greece

National Technical University of
Athens, Greece

University of Athens, Greece

6. Application of Porous Graphene in Electrochemical Sensors and Biosensors

Xiangjie Bo and Liping Guo

Universities of Jilin Province, P.R.
China

Northeast Normal University, P.R.
China

Handbook of Graphene

Volumes 1-8

7.Reduced Graphene Oxide for Biosensing and Electrocatalytic Applications

Anna Jabłońska, Sylwia Berbeć, Agnieszka Świetlikowska, Mateusz Kasztelan and Barbara Pałys
University of Warsaw, Poland

8.Recent Progress in the Graphene-Based Electrochemical Biosensors Development

Elzbieta Regulska and Joanna Breczko
University of Białystok, Poland

9.Electrochemical Biosensors Based on Green Synthesized Graphene and Graphene Nanocomposites

Mahmoud Amouzadeh Tabrizi and Lluís F. Marsal
Universitat Rovira i Virgili, Spain

10.Recent Biosensing Applications of Graphene-Based Nanomaterials

Kavita Arora
Jawaharlal Nehru University, India

11.Graphene-Based Sensors: Applications in Electrochemical (Bio)sensing

Claudia A. Razzino, Livia F. Sgobbi, Fernanda R. Marciano and Anderson O. Lobo

University of Vale do Paraiba, Brazil

Federal University of Goiás, Brazil

Brasil University, Brazil

Northeastern University, United States

Federal University of Piauí, Brazil

12.Graphene-Based Fiber Optic Label-Free Biosensor

Xianfeng Chen, Jianlong Zhao and Lin Zhang

Bangor University, United Kingdom

Chinese Academy of Science, China

Aston University, United Kingdom

13.Label-Free Biosensors Based on Graphene: State-of-the-Art

Seyed Morteza Naghib and Sadeq Ghorbanzade

Iran University of Science and Technology (IUST), Iran

Section 2: Advanced Sensors

14.Graphene Molecules as Platforms for SERS Detection: A Future Perspective

Nicolás Ramos-Berdullas, Nicolás Otero and Marcos Mandado
University of Vigo, Spain

15.Graphene-Based Electrochemical Aptasensors

V. Cengiz Ozalp, Göktuğ Karabiyik, A. Tahir Bayrac, Samet Uçak

and Bilge G. Tuna

Konya Food & Agriculture University, Turkey

Yeditepe University, Turkey

Karamanoglu Mehmetbey University, Turkey

Istanbul Altınbaş University, Turkey

16.Self-Organized 3D Graphene as a Robust Sensing Platform

F. Bourquard, C. Donnet, F. Garrelie, A.-S. Loir, F. Vocanson, V. Barnier, C. Chaix, C. Farre, N. Jaffrezic-Renault, F. Lagarde and G. Raimondi

University of Lyon, Jean Monnet University, France

National Higher School of Mines, France

University of Lyon, Institute of Analytical Sciences, France

17.Interactions of Molecular Species with Graphene and Graphene Sensing

Simin Feng, Ruitao Lv, Mauricio Terrones and Maria Cristina dos Santos

Tsinghua University, P. R. China

The Pennsylvania State University, USA

Universidade de São Paulo, Brazil

18.Graphene-Based Nanocomposite Materials for the Design of Electrochemical Sensors and Their Applications

Qinglin Sheng, Xiujuan Qiao, Ming Zhou, Tianli Yue and Jianbin Zheng

Northwest University, China

Universities of Jilin Province, China

Northeast Normal University, China

19.Self-Assembled Thin Films of Graphene Materials for Sensors

Celina M. Miyazaki, Cristiane M. Daikuzono and Marystela Ferreira
Universidade Federal de São Carlos, Brazil

20.Electrochemically Reduced Graphene Oxide: A Smart Material for Electrochemical Sensing

Sheetal K. Kaushik and Tinku Basu
Amity University, India

21.Graphene and Graphene Nanocomposite-Based Electrochemical Sensors

Mihaela Tertiş, Luminița Fritea, Robert Săndulescu and Cecilia Cristea

University of Medicine and Pharmacy, Romania

University of Oradea, Romania

22.Controlling the Electromagnetic and Electrochemical Sensing Properties of Graphenes via Heteroatom Doping

Faisal Shahzad and Chong Min Koo

Korea Institute of Science and Technology, Republic of Korea

University of Science and Technology, Republic of Korea

Pakistan Institute of Engineering and Applied Sciences (PIEAS), Pakistan

Korea University, Republic of Korea

23.Graphene and Graphene Composites-Modified Electrodes Surfaces for Selective Sensing of Dopamine in the Presence of Ascorbic Acid and Uric Acid

Nadeem Baig and Abdel-Nasser Kawde

King Fahd University of Petroleum & Minerals, Saudi Arabia

24.Finite Element Analysis of Graphene Materials

Androniki S. Tsiamaki, Dimitrios E. Katsareas and Nick K. Anifantis
University of Patras, Greece

25.Quantitative Real-Time Evaluation of C/O Ratios and Stepwise Control of Deoxidization of Graphene Oxide Using Plasmonic-Based Electrochemical Spectroscopy

Nan-Fu Chiu, Chun-Chuan Kuo, Cheng-Du Yang and Chi-Chu Chen
National Taiwan Normal University, Taiwan

26.Electronic Transport upon Adsorption of Biomolecules on Graphene

S.J. Rodríguez, L. Makinistian and E.A. Albanesi

Instituto de Física del Litoral (CONICET-UNL), Argentina

Universidad Nacional de San Luis-CONICET, Argentina

Universidad Nacional de Entre Ríos, Argentina

Volume 7: Biomaterials

Edited by Sulaiman Wadi Harun

1.Biological, Biomedical, and Medical Applications of Graphene and Graphene-Based Materials (G-bMs)

E.R. Sadiku, O. Agboola, I.D. Ibrahim, T. Jamiru, B.R. Avabaram, M. Bandla, W.K. Kupolati, O.S. Olafusi, J. Tippabattini, K. Varaprasad, K.A. Areo, S.C. Agwuncha, B.O. Oboirien, T.A. Adesola, C. Nkuna, J.L. Olajide, M.O. Durowoju, S.J. Owonubi, V.O. Fasiku, B.A. Aderibigbe,

V.O. Ojijo, D. Desai, R. Dunne, K. Selatile, G. Makgatho, M.C. Khoathane, W. Mhike, O.F. Biotidara, S. Periyar Selvam, Reshma B. Nambiar, Anand Babu Perumal, M.K. Dladlu, A.O. Adeboje, O.A. Adeyeye, S. Sanni, A.S. Ndamase, G.F. Molelekwa, K. Raj Kumar, J. Jayaramudu, O.O. Daramola, M.J. Mochane, Nnamdi Iheaturu, Ihuoma Diwe and Betty Chima

Tshwane University of Technology, RSA

Covenant University, Nigeria

Universidad de Talca, Chile

Edificio de Laboratorio CIPA, Chile

Ibrahim Babangida University, Nigeria

University of Johannesburg, South Africa

North-West University, RSA

University of Fort Hare, RSA

DST-CSIR National Centre for Nanostructured Materials, South Africa

Yaba College of Technology, Nigeria

SRM University, India

CSIR-North East Institute of Science and Technology, India

The Federal University of Technology, Nigeria

University of Zululand, RSA

Federal University of Technology Owerri, Nigeria

2.Effect of Graphene Oxide Nanosheets on the Structure and Properties of Cement Composites

Shenghua Lv
Shaanxi University of Science & Technology, China

3.Adaptation and Viability of Graphene-Based Materials in Clinical Improvement

Oludaisi Adekomaya, Emmanuel Rotimi Sadiku, Tamba Jamiru, Zhongjie Huan, Adeolu Adesoji Adediran, Daramola Oluyemi Ojo and Jimmy Lolu Olajide

Tshwane University of Technology, South Africa

Landmark University, Nigeria

The Federal University of Technology, Nigeria

4.Graphene-Based Synaptic Devices for Neuromorphic Applications

He Tian, Fan Wu and Tian-Ling Ren
Tsinghua University, China

5. Graphene-Based Materials for Implants

V.O. Fasiku, S.J. Owonubi,
E. Mukwevho, B.A. Aderibigbe,
Y. Lemmer, Revaprasadu Neerish
and E.R. Sadiku

North West University, South Africa

University of Kwazulu-Natal, South
Africa

University of Zululand, South Africa

University of Fort Hare, South
Africa

Polymers and Composites,
Material Science and
Manufacturing, CSIR, South Africa

Tshwane University of Technology,
South Africa

6. Ultrashort Pulse Fiber Laser Generation Using Molybdenum Disulfide and Tungsten Disulfide Saturable Absorber

Sulaiman Wadi Harun,
Anas Abdul Latiff and Harith Ahmad

University of Malaya, Malaysia

Universiti Teknikal Malaysia
Melaka, Malaysia

University of Malaya, Malaysia

7. Graphene-Modified Asphalt

Xinxing Zhou
Shanxi Transportation Research
Institute, PR China

8. Graphene-Based Materials for Brain Targeting

B.A. Aderibigbe, T. Naki
and S.J. Owonubi

University of Fort Hare, South
Africa

University of Zululand, South
Africa

9. Antimicrobial Activities of Graphene-Based Materials

Shesan J. Owonubi,
Victoria O. Fasiku
and Neerish Revaprasadu

University of Zululand, South
Africa

University of KwaZulu-Natal,
South Africa

10. Graphene Quantum Dots—A New Member of the Graphene Family: Structure, Properties, and Biomedical Applications

Svetlana Jovanovic
University of Belgrade, Serbia

11. Functionalized Graphene Nanomaterials as Biocatalysts: Recent Developments and Future Prospects

Nalok Dutta and Malay Kr. Saha

National Institute of Cholera and
Enteric Diseases, India

Volume 8: Technology and Innovation

Edited by Sulaiman Wadi Harun

1. Reworking Defective Soldering Joints With Graphene Sheets and Gold Nanoparticles

Ezzat G. Bakhoun
University of West Florida, USA

2. Printed Graphene Radio Frequency and Sensing Applications for Internet of Things

Ting Leng, Kewen Pan and Zhirun Hu
University of Manchester, UK

3. Modeling and Characterization of the Metal Contact and the Channel in a Graphene Device

Nahid M. Hossain and
Masud H. Chowdhury
University of Missouri—Kansas
City, USA

4. Modeling of Graphene-Based Electronics: From Material Properties to Circuit Simulations

Yu He
Purdue University, USA

5. Hybrid Graphene—Silicon Photonic and Optoelectronic Integrated Devices

Zhenzhou Cheng, Jiaqi Wang
and Liang Wang

Tianjin University, China

Shenzhen University, China

The Chinese University of Hong
Kong, Hong Kong

6. Sustainability, Research, and Development of Graphene for Engineering Applications

W. K. Kupolati, E. R. Sadiku,
A. Frattari, C. Trois, A. A. Adeboje,
C. Kambole, K. S. Mojapelo, A. A. Eze,
M. R. Maite, I. D. Ibrahim, A. Imoru,
F. Berghi, B. J. Labana,
S. Nyende-Byakika and T. A. Adegbola

Tshwane University of Technology,
South Africa

University Centre for Smart
Building (CUNEDI) and Department
of Civil, Environmental and
Mechanical Engineering, Italy

University of KwaZulu-Natal,
South Africa

7. Graphene Oxide Multilayers Obtained from Bamboo: New Synthesis Method, Basic Properties, and Future Electronic Applications

J. J. Prias-Barragán, K. Gross,
H. Ariza-Calderón and P. Prieto

Universidad del Quindío, Colombia

Universidad del Valle, Colombia

8. Laser Direct-Writing Graphene Oxide to Graphene—Mechanisms to Applications

Rakesh Arul, Reece N. Oosterbeek,
B.P.P. Mallett and M. Cather Simpson

The University of Auckland, New
Zealand

The MacDiarmid Institute
for Advanced Materials and
Nanotechnology and The Dodd
Walls Centre

for Quantum and Photonic
Technologies, New Zealand

University of Cambridge, United
Kingdom

9. Wave Propagation Responses of Double-Layered Graphene Sheets in Hygrothermal Environment

Farzad Ebrahimi and Ali Dabbagh
Imam Khomeini International
University, Iran

10. Graphene Terahertz Leaky-Wave Antennas

Walter Fuscaldo, Paolo Burghignoli,

Paolo Baccarelli
and Alessandro Galli

Sapienza University of Rome, Italy

Roma Tre University, Italy

11. Terahertz Applications of Graphene

Minjie Wang and Eui-Hyeok Yang
Stevens Institute of Technology,
USA

12. Modelling of Graphene Nanoribbons Antenna Based on MoM-GEC Method to Enhance Nanocommunications in Terahertz Range

M. Aidi, M. Hajji, H. Messaoudi
and T. Aguilu
Tunis El Manar University, Tunisia

13. Graphene-Based Plasmonic Components for THz Applications: Planar Ring Array Devices

Victor Dmitriev and
Clerisson Nascimento
Federal University of Para, Brazil

14. Continuous Graphene Oxide Fiber and Its Applications

Nuray Ucar and Ilkay Ozsev Yuksek
Istanbul Technical University,
Turkey

15. Buckling Characteristics of Bilayer Graphene Sheets Subjected to Humid Thermomechanical Loading

Farzad Ebrahimi and
Mohammad Reza Barati
Imam Khomeini International
University, Iran

16. Polymer/Graphene Nanomaterials: A Platform for Current High-Tech Applications

Ayesha Kausar
National University of Sciences
and Technology (NUST), Pakistan

17. Graphene-Based Advanced Nanostructures

Ahmad Allahbakhsh
Hakim Sabzevari University, Iran

Handbook of Graphene

Volumes 1-8

Editors:

Edvige Celasco, Department of Physics, University of Genoa, Italy

Alexander N. Chaika, Institute of Solid State Physics, Russian Academy of Sciences, Russia

Tobias Stauber, Institute of Materials Science, Spanish National Research Council, Spain

Mei Zhang, High-Performance Materials Institute, Florida State University, USA

Cengiz Ozkan, Department of Materials Science & Engineering, University of California, USA

Umit Ozkan, Chemical and Biomolecular Engineering, Ohio State University, USA

Barbara Palys, University of Warsaw, Poland

Sulaiman Wadi Harun, Department of Electrical Engineering, University of Malaysia

CONTACT US

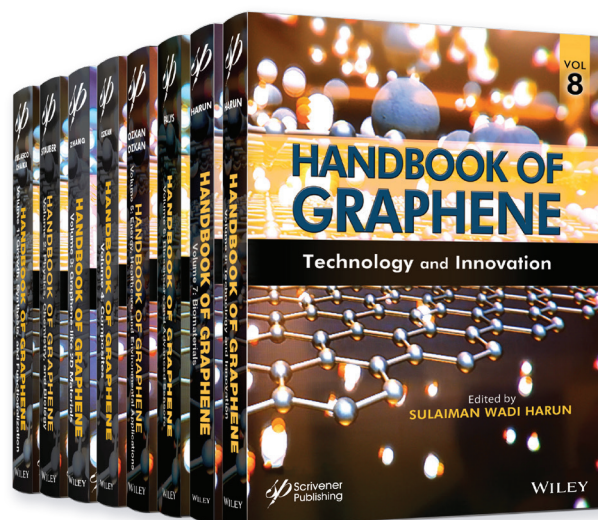
For online edition

Recommend this title to your librarian.

Librarians - please contact your Wiley Account Manager or email us at onlinelibrarysales@wiley.com to find out about access and pricing for your institution.

For print edition:

Please contact your local Wiley sales representative to place your orders or for any queries.



8 Volumes Set | Print ISBN 9781119459903

Hardcover | 4746 pages

June 2019 | List price US\$2,199.95

Online ISBN 9781119468455

WILEY OFFICES IN ASIA:

China

china_marketing@wiley.com

www.wileychina.com

Beijing (86) 10 8418 7800

Shanghai (86) 21 8036 1200

India

csupport@wileyindia.com

New Delhi (91) 11 4 363 0000

East India (91) 9973156158

Bangalore (91) 80 23132383

Mumbai (91) 22 27889272

Chennai (91) 98410 22399

Hyderabad 9866 43949

Indonesia

asiaorders@wiley.com

Banten (62) 21 5316 0520

Japan

marketing@wiley.co.jp

www.wiley.co.jp

Tokyo (81) 3 3830 1232

Malaysia

asiaorders@wiley.com

Selangor (60) 3 7712 2000

South Korea

akorea@wiley.com

Seoul (82) 2 338 9700

Taiwan

ataiwan@wiley.com

Taipei (886) 2 2357 3900

Singapore, and other Asian countries

asiaorders@wiley.com

Singapore (65) 6643 8333

www.wiley.com

(information is accurate as of June 2019)


Scrivener
Publishing

WILEY