


Carbon Nanotube and Graphene Device Physics


By H.-S. Philip Wong, Deji Akinwande



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Explaining the properties and performance of practical nanotube devices and related applications, this is the first introductory textbook on the subject. All the fundamental concepts are introduced, so that readers without an advanced scientific background can follow all the major ideas and results. Additional topics covered include nanotube transistors and interconnects, and the basic physics of graphene. Problem sets at the end of every chapter allow readers to test their knowledge of the material covered and gain a greater understanding of the analytical skill sets developed in the text. This is an ideal textbook for senior undergraduate and graduate students taking courses in semiconductor device physics and nanoelectronics. It is also a perfect self-study guide for professional device engineers and researchers.

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Editorial Review

Review

"I strongly recommend this text book to students, engineers and researchers... Readers, interested in graphene and carbon nanotube based devices, have the possibility to train themselves on the hottest topics and challenges which will pave the future of nanotechnology." - Simon Deleonibus, ST Microelectronics

"An excellent and timely volume on the physics and applications of carbon nanotubes. A must read for students and researchers in this hot field." Yuan Taur, UCSD

"This is the textbook that I have been aspiring to see for a long time. With excellent timing, the authors provide one that covers device physics of carbon nanotubes in a coherent, systematic way. The content is perfectly designed and formulated such that both students with little knowledge and researchers with hands-on experience in the field would find it extremely valuable. I would highly recommend this book to anyone who is interested in 'post-silicon' electronics." Bin Yu, State University of New York, Albany

"I strongly recommend this text book to students, engineers and researchers who wish to build up their knowledge on carbon nanotube fundamentals and applications. They will extend their learning from materials technology and solid state physics to their applications in the fields of nanoelectronics and micro-nanosystems. The readers, interested by graphene and carbon nanotubes based devices, have the possibility to train themselves on the hottest topics and challenges which will pave the future of nanotechnology." Simon Deleonibus, IEEE Fellow, CEA-LETI Chief Scientist and Research Director, MINATEC, Grenoble, France

"This book is an excellent overview of carbon-based electronics, and in particular it provides the reader with an up-to-date and crisp description of the physical and electrical phenomena of carbon nanotubes, as well as a perspective on new applications enabled by this nanotechnology.

Both experts and students will enjoy reading this book, as it brings up to focus the important details of carbon solid-state physics to understand the ground rules of carbon transistors and the related nanoelectronic circuits. Moreover, from a global point of view, carbon electronics is a key nanotechnology supporting the continuous development of the information age in computing, sensing and networking." Giovanni De Micheli, EPFL

"Excellent book covering all aspects of carbon nanotube devices from basic quantum physics in solids over material and device physics to applications including interconnects, field effect transistors and sensors. First complete book in an exciting new nanoelectronics field with great potential, intended for undergraduate and graduate students, researchers in the field and professional engineers, enabling them to get an insight in the field or to broaden their competence." Cor Claeys, IMEC, Leuven, Belgium

About the Author

H. S. Philip Wong is a Professor of Electrical Engineering at Stanford University, where he has worked since 2004. Prior to joining Stanford University, he spent 16 years at IBM T. J. Watson Research Center, Yorktown Heights, New York, where he held various positions from Research Staff Member to Senior Manager. He is a Fellow of the IEEE and his current research covers a broad range of topics including carbon nanotubes, semiconductor nanowires, self-assembly, exploratory logic devices,

nanoelectromechanical devices, and novel memory devices.

Deji Akinwande is an Assistant Professor at the University of Texas, Austin, which he joined after receiving his Ph.D. from Stanford University in 2009. Prior to beginning his Ph.D., he gained industry experience at Agilent Technologies, XtremeSpectrum/Freescale, and Motorola. He has published widely on carbon nanomaterials.

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