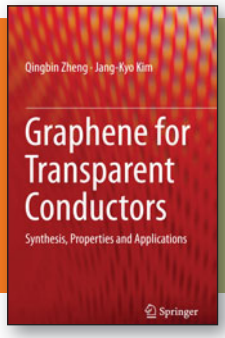
than covered in the book, it provides the full overview and references needed for a full perspective.

This book will be highly useful to materials scientists and engineers beyond those explicitly interested in armor and munitions, as the mathematics and mechanics of materials presented in the book are of immediate use to anyone researching impact-absorbing materials. Relevant fields range from medical implants to civil and automotive engineering. The classical knowledge of armor and impact could also find relevance in fields of ion bombardment and nanomanufacturing techniques. I can also see this as a good short-course textbook for undergraduate and even graduate mechanics of materials classes, as it clearly illustrates practical examples of how the mechanics, composition, and formulation of materials affect their ability to damage or withstand damage from another material. Additionally, the book contains useful charts and tables that summarize the mechanical attributes (e.g., fracture toughness, Young's modulus). It falls short of being a comprehensive mechanics of materials book because it does not address all mechanical attributes of materials behavior, such as time-dependent creep, and the materials focus is on those used for armor. The only small drawback of the book is that the references clearly emphasize innovations derived from the UK, and a broader source of resources would have brought more balance. However, it fully meets its purpose of describing the materials, theory, and design of armor, and most materials scientists (and even some military historians) would greatly benefit from reading it to gain a grounded perspective on how the mechanics of materials has affected the survivability of armies, and thus largely determined the path of history.

Reviewer: Karen Swider Lyons *researches fuel-cell and battery materials and their integration into naval systems in Alexandria, Va., USA.*



Graphene for Transparent Conductors: Synthesis, Properties and Applications

Qingbin Zheng and Jang-Kyo Kim

Springer, 2015
220 pages, $129.00 (e-book $99.00)
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After reading this book three times, I found it to be a valuable resource and easy to read. This book gives a quick overview for anyone who wants to know all that is happening in the indium tin oxide (ITO) replacement space, and where graphene could fit in if and when a suitable application and a willing and able market are met. To the credit of the authors, no outrageous claims are made either in terms of its potential or to find real applications.

Chapter 1 nicely introduces all of the ITO replacement options, including transparent conductive oxides with reduced amounts of indium, transparent conducting polymers, transparent conducting metals, and transparent conducting carbon, including graphene.

Chapter 2 eloquently describes the synthesis, structure, and properties of graphene and graphene oxide. It includes discussions of the electronic/electrical, thermal, optical, and mechanical properties of these films. It also includes useful detailed information of characterization tools that are commonly used in laboratories, such as atomic force microscopy, electron microscopy, scanning tunneling microscopy, and Raman spectroscopy.

Chapter 3 includes adequate information on different practical fabrication or deposition techniques, such as electrophoretic deposition, spin coating, spray coating, dip coating, rod coating, and even inkjet coating with valuable details of each approach.

Chapter 4 discusses improving electrical conductivity and transparencies by chemical doping, adding nanofillers, including other ITO replacement materials such as single-wall carbon nanotubes, Ag nanowires, ZnO nanorods, and metal grids. Graphene oxide is also considered and described in these contexts.

Chapter 5 briefly describes potential applications in display touchscreens, light-emitting diodes, solar cells, transistors, electromagnetic interference shielding, and functional glass for transparent solutions looking for a killer application.

Chapter 6 is a prospective chapter that clearly mentions all the potential challenges ahead and possible applications.

This book does not include worked examples or homework problems for use as a textbook. Instead, due to the emphasis on applications rather than fundamentals, this is more appropriate for readers in industry. It is an enjoyable read with rich and valuable references to original works. It can be used as a fantastic learning tool for anyone who wants to get an overview of where graphene research is heading in terms of finding real applications, or for anyone looking for an application that could create and serve a niche market.

Reviewer: Sudip Mukhopadhyay *is a Honeywell Fellow at Honeywell, Calif., USA.*

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