

## Piezotronics and Piezo-Phototronics

Bearbeitet von  
Zhong Lin Wang

1. Auflage 2013. Buch. xi, 248 S. Hardcover

ISBN 978 3 642 34236 3

Format (B x L): 15,5 x 23,5 cm

Gewicht: 555 g

[Weitere Fachgebiete > Technik > Werkstoffkunde, Mechanische Technologie > Materialwissenschaft: Elektronik, Optik](#)

schnell und portofrei erhältlich bei

  
DIE FACHBUCHHANDLUNG

Die Online-Fachbuchhandlung [beck-shop.de](http://beck-shop.de) ist spezialisiert auf Fachbücher, insbesondere Recht, Steuern und Wirtschaft. Im Sortiment finden Sie alle Medien (Bücher, Zeitschriften, CDs, eBooks, etc.) aller Verlage. Ergänzt wird das Programm durch Services wie Neuerscheinungsdienst oder Zusammenstellungen von Büchern zu Sonderpreisen. Der Shop führt mehr als 8 Millionen Produkte.

# Preface

The fundamental principles of piezotronics and piezo-phototronics were introduced by my group in 2007 and 2010, respectively. Due to the polarization of ions in a crystal that has non-central symmetry in materials such as the wurtzite structured ZnO, GaN, and InN, a piezoelectric potential (*piezopotential*) is created in the crystal by applying a stress. Owing to the simultaneous possession of piezoelectricity and semiconductor properties, the piezopotential created in the crystal has a strong effect on the carrier transport at the interface/junction. *Piezotronics* concerns the devices fabricated using the piezopotential as a “gate” voltage to tube/control charge carrier transport at a contact or junction. The *piezo-phototronic effect* is to use the piezopotential to control the carrier generation, separation, transport, and/or recombination for improving the performance of optoelectronic devices, such as photon detector, solar cell, and LED. The functionality offered by piezotronics and piezo-phototronics are complementary to CMOS technology. By an effective integration of piezotronic and piezo-phototronic devices with silicon-based CMOS technology, some unique applications can be found in areas such as human-computer interfacing, sensing and actuating in nanorobotics, smart and personalized electronic signatures, smart MEMS/NEMS, nanorobotics, and energy sciences. This book introduces the fundamentals of piezotronics and piezo-phototronics.

I would like to thank my group members and collaborators who contributed to the development of piezotronics and piezo-phototronics (not in particular order): Jun Zhou, Wenzhuo Wu, Youfan Hu, Qing Yang, Yan Zhang, Ying Liu, Xudong Wang, Caofeng Pan, Jr-Hau He, Yifan Gao, Xiaonan Wen, Weihua Han, Yusheng Zhou and many others. We acknowledge generous financial support from DARPA, NSF, DOE, NASA, Airforce, NIH, Samsung, MANA NIMS, Chinese Academy of Sciences, and Chinese Scholars Council. I like to thank Georgia Tech and the Center for Nanostructure Characterization (CNC) for support in facility and infrastructure.

Lastly and most importantly, I thank my wife and our daughters for their years of support and understanding. It would not have been possible to carry out such a research without their support.

Atlanta

Zhong Lin Wang