

<<纳米功能材料>>

图书基本信息

书名：<<纳米功能材料>>

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前言

大学最重要的功能是向社会输送人才。

大学对于一个国家、民族乃至世界的重要性和贡献度，很大程度上是通过毕业生在社会各领域所取得的成就来体现的。

中国科学技术大学建校只有短短的50年，之所以迅速成为享有较高国际声誉的著名大学之一，主要就是因为她培养出了一大批德才兼备的优秀毕业生。

他们志向高远、基础扎实、综合素质高、创新能力强，在国内外科技、经济、教育等领域做出了杰出的贡献，为中国科大赢得了“科技英才的摇篮”的美誉。

2008年9月，胡锦涛总书记为中国科大建校五十周年发来贺信，信中称赞说：半个世纪以来，中国科学技术大学依托中国科学院，按照全院办校、所系结合的方针，弘扬红专并进、理实交融的校风，努力推进教学和科研工作的改革创新，为党和国家培养了一大批科技人才，取得了一系列具有世界先进水平的原创性科技成果，为推动我国科教事业发展和社会主义现代化建设做出了重要贡献。

据统计，中国科大迄今已毕业的5万人中，已有42人当选中国科学院和中国工程院院士，是同期（自1963年以来）毕业生中当选院士数最多的高校之一。

其中，本科毕业生中平均每1000人就产生1名院士和700多名硕士、博士，比例位居全国高校之首。

还有众多的中青年才俊成为我国科技、企业、教育等领域的领军人物和骨干。

在历年评选的“中国青年五四奖章”获得者中，作为科技界、科技创新型企业界青年才俊代表，科大毕业生已连续多年榜上有名，获奖总人数位居全国高校前列。

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内容概要

本书包括4个部分。

第1部分（第1至5章）介绍了多种纳米功能材料（如纳米线、纳米颗粒）的制备、处理、功能化与表征。材料制备是实现材料应用的一个重要环节。

第2部分（第6到10章）侧重于纳米材料的电子转移性能以及在纳米电子器件和分子电子器件上的重要性。

第3部分（第11到13章）总结了近年来纳米功能材料在能源研究上的一些进展（如太阳能、燃料电池）。

第4部分（第14到16章）介绍纳米材料在生物标定、检测和敏感器件中的应用。

本书可作为从事纳米材料及其相关领域科研人员的技术参考资料，也可以作为高年级本科生和研究生相关课程的辅助读物。

书籍目录

Preface of Alumni's Serials Preface Shaowei Chen and Wenbin Lin Part Nanomaterial Chemistry Chapter 1
Shape-Controlled Synthesis of Palladium Nanostructures Yujie Xiong and Younan Xia Chapter 2
Synthesis and Optical Properties of Anisotropic Silver Nanocrystals: Shape and Size Matters Rongchao Jin
Chapter 3 Chemical Transformation of Colloidal Nanocrystals Can K. Erdonmez and Yadortg Yin Chapter
4 Gold Nanoparticles with Controlled Chemical Functional Groups: Synthesis and Applications Qiu Dai,
Jianhua Zou, Xiong Liu and Qun Huo Chapter 5 Synthesis of Colloidal Group - Semiconductor
Nanocrystals Haitao Liu Part Nanoelectronics and Molecular Electronics Chapter 6 One-Dimensional
Semiconductor Nanostructures for High-Performance, Flexible Electronics and Sensors Yugang Sun Chapter 7
Rational Synthesis and Characterization of InAs Nanowires Deli Wang Chapter 8 Electronic Properties and
Applications of Ultra-High Density Silicon Nanowire Arrays Dunwei Wang Chapter 9 Molecular Junctions
Based on Self-Assembly Monolayers Xiaojuan Fan Chapter 10 Scanning Force Microscopy: From
Topographical to Functional Imaging Liwei Chen and Wei Lu Part Nanomaterials and Energy Science
Chapter 11 Theoretical Study of Photoinduced Electron Transfer Reactions in Dye-semiconductor
Nanosystems Haobin Wang Chapter 12 Zeolite Thin Films Christopher M. Lew, Rui Cai and Yushan Yan
Chapter 13 Metal Nanoparticles as Anode Electrocatalysts for Direct Liquid Fuel Cells Wei Chen and Shaowei
Chen Part Nanomaterials and Biomolecules Chapter 14 Designing Functional Hybrid Nanomaterials by
Combining Molecular Chemistry with Nanotechnology Jason S. Kim and Wenbin Lin Chapter 15 Inorganic
Mesoporous Materials as the Supports for Proteins and Enzymes in the Third-Generation Electrochemical
Biosensors Ling Zhang, Qian Zhang and Jinghong Li Chapter 16 Nanoprobng in Biological Sciences Weiwei
Gu

章节摘录

插图：I Introduction Nanocrystals are clusters of hundreds to hundred thousands of atoms with sizes from several to several hundred nanometers. Semiconductor nanocrystals exhibit interesting size and shape dependent properties. 1-3 Due to its small size, a large fraction of atoms in nanocrystal are located on the surface.

Many physical properties of nanocrystals, such as melting point and phase transition pressure, are affected by this surface effect. In addition, the electronic structure of nanocrystal is quite different from that of the bulk. Similar to the bulk, the electronic structure of semiconductor nanocrystals consists of conduction band and valence band, separated by a band gap. However, there are also discrete energy levels near the band edge, a feature otherwise only found in molecules and atoms. Due to the quantum confinement effect, the band gap of semiconductor nanocrystals generally increases as its size decreases. Depending on the shape of the nanocrystal, the quantum confinement can be 3D (quantum dot), 2D (quantum rod), or 1D (quantum well) (Figure 1). 4 Figure 1. Left: Density of states of bulk semiconductor, semiconductor nanocrystal and atom. Right: Density of states in bulk semiconductor, quantum well, quantum rod, and quantum dot. (Reproduced with permission from Ref. 4. Copyright 1996 American Chemical Society) Size and shape are two of the most important parameters in defining the electrical and optical properties and hence applications of nanocrystals.

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编辑推荐

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