

<<一维纳米结构材料>>

图书基本信息

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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五十年，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名院士和七百多名硕士、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

纳米材料是20世纪80年代中期一个迅速发展的材料科学领域，受到人们广泛的关注。

《一维纳米结构材料概念、应用和展望（英文版）》选择性的汇集了国内外中国科技大校友在一维纳米材料的最新科技研究成果。

书中介绍了一维纳米材料包括纳米线、纳米管和纳米带等当今研究的趋势、相关技术与未来发展方向，是化学、物理和材料等学科的基础理论研究与应用技术的前沿集成反映。

《一维纳米结构材料概念、应用和展望（英文版）》适合于高等学校、科研院所以及相关企业从事纳米材料研发的科研人员和管理工作者，同时也可作为相关专业的师生和爱好者学习参考用书。

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章节摘录

插图：When a NW was deflected, the outer surface was stretched and the inner surface was compressed. According to the piezoelectric effect, an electric field E_z was generated along the Z axis of the NW. This induced a voltage drop V_s to V_s across the top end of the NW with first order approximation. This potential drop was created by the relative displacement of Zn^{2+} cations and O^{2-} anions, so it cannot be freely moved or neutralized without any injected carriers. Thus this potential is persisted in the deflection process of the NWs. The AFM tip is a Si tip coating with Pt layer. Due to the large workfunction difference of Pt and ZnO, they form a Schottky contact between the tip and the NW. When the AFM tip was in contact with the front end (stretched side) of the NW, which has a positive bias, the metal and semiconductor contact is negative biased. The current flow was prohibited by the Schottky contact. When the tip moved the compressed side of this NW, the metal and semiconductor contact is positive biased. This produced a sudden increase in the conducting current. This current is formed by the voltage drop across the contacts. The free electrons flow from the loop into the NW and neutralized ionic charges formed by the piezoelectric effect. Thus the VL starts to drop to zero. This piezoelectric energy formation and releasing principle is shown in Figure 2.16 which is the basic working principle of nanogenerator and nanopiezoelectronics. In this section, a new field in nanotechnology, nanopiezotronics is introduced. Working principle of these devices relies on the unique coupling of ZnO's piezoelectric and semiconducting properties. In the demonstrated work, piezotronics devices based on ZnO NW exhibit potentials to convert biological mechanical energy, acoustic/ultrasonic vibration energy, and biofluid hydraulic energy into electricity. This is a new path way for energy converting and collecting, which is a crucial progress for self-power nanodevices.

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