

# 高分子科学系列讲座

高分子物理与化学国家重点实验室 中国科学院长春应用化学研究所

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从事专业	材料工程		
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报 告 时 间	2013.06.24 上午 10:00	报 告 地 点	主楼四楼学术报告厅(410 房间)
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报 告 人 背 景	<p>2007 年获得美国加州大学洛杉矶分校材料科学与工程博士学位。2007-2009 年, 黄劲松在美国波士顿安捷讯公司任研究科学家。2009 年, 黄劲松加入美国内布拉斯加州立大学机械材料工程系任助理教授, 博士生导师, 2013 年任材料博士专业主任。美国自然科学基金的杰青 (2013), 美国国防部基金的杰青(2011)。</p> <p>研究兴趣: 有机电子器件物理和设计</p> <p>Recent Huang Group's Research Highlights:  NSF Discovery: "Producing Solar Energy Materials That Are Affordable, Efficient and Flexible"  UNL News Release: "MME's Huang uses nanocomposites to improve photodetectors"  Advanced Materials Frontispiece: "Solution-Processed Fullerene-Based Organic Schottky Junction Devices for Large-Open-Circuit-Voltage Organic Solar Cells"  Energy and Environmental Science Cover Story: "Crystallinity is essential for organic photovoltaic devices"  UNL News Release: "Huang increases organic solar cells' efficiency with ferroelectric polymer layers"</p>		
报 告 题 目	<p><b>Applications of Interfacial and Bulk Organic Ferroelectric Dipoles for Organic Photovoltaic Devices for High Efficiency</b></p>		
内 容 摘 要	<p>Ferroelectric materials are generally not thought to be applicable for efficient solar energy harvesting by photovoltaic effect because they are mostly good insulators due to their large bandgaps. In this talk, a unique approach will be introduced to apply organic ferroelectric interfacial and bulk dipoles, mainly PVDF and its co-polymers, in all organic photovoltaic devices to demonstrate switchable photovoltaic phenomenon, and to increase energy conversion efficiency.</p> <p>In this approach, ultrathin polymer ferroelectric dipoles were inserted at the interface of metal electrodes and organic semiconducting active layer in organic photovoltaic devices. An aligned ferroelectric dipole layer can boost the efficiency of organic photovoltaic devices with its huge density spontaneous polarization charges that induce a large electric field into the intrinsic organic semiconducting active layer. The morphology of the ferroelectric layer, including crystallinity, coverage, and domain size, played a critical role in determining the efficiency of the devices. In addition to Langmuir-Blodgett coating process, a new method to pre-form polymer ferroelectric nanoparticles with controlled size and crystallinity will be introduced. The application of the polymer ferroelectric nanoparticle as interfacial layer in organic photovoltaic devices led to optimized device performance.</p>		