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器件制备及器件物理

磷酸酯聚芴阴极界面修饰层对聚合物电致发光性能的影响

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摘要： 发展了基于稳定金属电极的阴极界面材料，对促进聚合物电致发光器件的产业化进程具有重要意义。侧链含磷酸酯功能基团的聚芴衍生物（PF-EP）是一种极性聚合物中性材料，能溶于乙醇等醇类溶剂，非常适合制备多层溶液加工型发光器件。除此之外，它结合稳定的金属Al电极能实现有效电子注入。本文以PF-EP在绿光聚芴发光器件中的应用为例，详细对比分析了两种基于PF-EP的阴极电极结构（PF-EP/LiF/Al和PF-EP/Al）的器件EL性能。结果显示，PF-EP/LiF/Al阴极结构具有更优异的电子注入能力。基于单电子器件和X射线光电子能谱，本文对这一高效电子注入结构的注入能力和注入机理进行了探讨。

关键词： 磷酸酯聚芴 界面修饰 聚合物电致发光

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Effect of Phosphonate-functionalized Polyfluorene as Cathode Interfacial Layer on Electroluminescence Properties of Polymer Light-emitting Diodes

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Abstract: It is of great importance for developing stable-metal-based cathode interfacial layer of polymer light-emitting diodes (PLEDs), which is one of the key points for the mass-production techniques of PLEDs. Phosphonate-functionalized polyfluorene (PF-EP) is a neutral polar polymer material, which is soluble in alcohol solvent (thus being compatible for preparing multilayer solution-processed lighting devices). And most importantly, it can achieve highly efficient electron injection current in conjunction with stable aluminum as cathode. Herein, we systematically discussed the applications of two cathode structures of PF-EP/LiF/Al and PF-EP/Al in a prototype green-polyfluorene based PLEDs. The results indicate that the structure of PF-EP/LiF/Al possesses much higher electron injection capability than PF-EP/Al. The electron injection behavior and mechanism has been discussed based on the studies on the electron-only devices and X-ray photoelectron spectroscopy.

Keywords: phosphonate-functionalized polyfluorene interfacial modification polymer light-emitting diodes
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