

论文

含稀土铕络合物的三元共聚物的光电性质

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摘要 合成了可平衡电荷(空穴与电子)传输的三功能合一的稀土铕发光材料,将几种稀土铕络合物单体与乙烯基咔唑、甲基丙烯酸甲酯共聚制得含咔唑和稀土铕络合物的空穴传输层发光层电子传输层(HTLEMLETL)三功能合一的聚合物,并研究它们的电化学及电致发光性能. 电化学分析表明这类三元共聚物兼有氧化性和还原性,氧化电位及还原电位分别为0.75V和-1.8V左右,可见这类材料同时具有空穴传输和电子传输功能. 从测定的电致发光谱看,AlQ3、TPD及咔唑基等发光单元在器件中没有共发光,而是起电荷传输作用,以这些材料制作的电致发光器件所发的红光纯度都比较高.

关键词 [稀土铕](#) [络合物](#) [共聚物](#) [电化学](#) [电致发光](#)

分类号

ELECTROCHEMICAL AND ELECTROLUMINESCENT PROPERTIES OF SOME EUROPIUM COMPLEXES AND THEIR TERPOLYMERS

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Abstract The electrochemical and electroluminescent properties of some europium complexes and the terpolymers of 9-vinylcarbazole, methyl methacrylate and europium-methacrylate complex were investigated. Cyclic voltammetry measurements of poly(VK-co-MMA-co-Eu(BA)₂(MAA)phen)(C1) showed a quasi-reversible oxidation peak with onset of 0.75 V, and an irreversible reduction peak with onset of -1.8V. The results demonstrated that this kind of multi-functional material has both hole- and electron-transporting properties. Some light-emitting diodes(LEDs) based on the europium containing complex and copolymers were fabricated. All these devices exhibited characteristic sharp red electroluminescence when forward biases were applied, and the turn-on voltage was in the range of 12~27 V. A maximum brightness of 52 cd/m² with a luminous efficiency of about 0.031 lm/W was achieved from a single-layer device based on the multi-functional copolymer C3. EL spectra of the devices showed that the emissions were from the corresponding lanthanide-complex units, instead of carbazole groups of the copolymers. It is suggested that the carbazole groups in Cn serve as hole-transport material while electron transfer may occur through the lanthanide-containing moieties of the same copolymer.

Key words [Europium Complex](#) [Copolymer](#) [Electrochemistry](#) [Electroluminescence](#)

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