

论文

一类近红外电致发光芴基共聚物的合成和性能研究

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摘要 基于9,9-二辛基芴与窄带隙单体5,7-二(2-噻吩基)噻[3,4-b]并[1,4]二噻(DTP),通过Suzuki偶合反应,合成了一系列无规窄带隙的芴基共聚物(PFO-DTP),并对它们的紫外-可见吸收光谱、光致发光和电致发光性能进行了初步研究.共聚物在380 nm和632 nm处有两个明显的吸收峰,其中632 nm处的吸收随着共聚物中窄带隙单体(DTP)含量的增加而加强,最大电致发光峰随着共聚物中窄带隙单体(DTP)含量的增加,从752nm红移到了781 nm.同时与其同分异构体4,7-二(2-噻吩基)苯并噻二唑(DBT)与芴的共聚物PFO-DBT相比,该类聚合物的吸收红移,与近地太阳光谱更为匹配.

关键词 [9,9-二辛基芴](#) [5,7-二\(2-噻吩基\)噻\[3,4-b\]并\[1,4\]二噻](#) [共聚物](#) [电致发光](#) [近红外](#)

分类号

SYNTHESIS AND CHARACTERIZATION OF NEAR-INFRARED ELECTROLUMINESCENT FLUORENE-BASED CONJUGATED COPOLYMERS

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Abstract A series low band—gap conjugated copolymers(PFO—DTP)derived from 9,9-dioctylfluorene(DOF)and 5,7-dithien-2-ylthieno[3,4-b]pyrazine(DTP)is prepared by the palladium—catalyzed Suzuki coupling reaction with the feed ratios of DTP mole percents around 1%,5%,15%,30%. The resulted pdymeers are soluble in common organic solvents. There are two absorbance peak around 380 nm and 632 nm in the spectra of copolymem. The absorbance peak around 632 nm increased as the DTP contents increased. Maximum external quantum efficiency reaches 0. 1%in devices of copolymers with the DTP content at 5 mol%. In comparison with its very well studied isomer copolymer poly(2,7-(9,9-dioctyl-fluorene)-co-4,7-di-2-thienyl-2',1',3'-benzothiadiazole),the pdy(2,7-(9,9-dioctylfluorene)-co-5,7-dithien-2-ylthieno[3,4-b]pyrazine)(PFO—DTP)shows a red shift of about 110 nm for photoluminescence(PL)and electroluminescence(EL)emissions,and the optical onset wavelength of the PFO—DTP is red shifted about 130 nm and their optical response is more matching the optical spectra of the solar terrestrial radiation. These copolymers are promising candidate materials for near-infrared light—emitting diodes and polymeric photovoltaic solar cell.

Key words [9,9-Dioctylfluorene](#) [5,7-Dithien-2-ylthienopyrazine](#) [Copolymer](#) [Electroluminescence](#) [Near-infrared light](#)

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