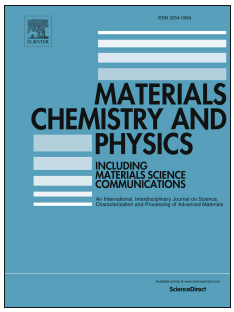
Accepted Manuscript



Synthesis and characterization of novel red-emitting conjugated polymers based on triphenylaminesilole-carbazole-fluorene

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PII: S0254-0584(18)30060-9

DOI: 10.1016/j.matchemphys.2018.01.060

Reference: MAC 20332

To appear in: *Materials Chemistry and Physics*

Please cite this article as: Zhitian Liu, Linhua Zhang, Xiang Gao, Qi Zhang, Shengwei Shi, Synthesis and characterization of novel red-emitting conjugated polymers based on triphenylaminesilole-carbazole-fluorene, *Materials Chemistry and Physics* (2018), doi: 10.1016/j.matchemphys.2018.01.060

Synthesis and Characterization of Novel Red-Emitting Conjugated Polymers Based on Triphenylaminesilole-Carbazole-Fluorene

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Abstract A series of novel red-emitting conjugated polymers were synthesized, adopting host-guest technique, with fluorene-carbazole backbone and low bandgap unit, 1,1-dimethyl-3,4-di(triphenylamine)-2,5-dithienyl)silole, as the guest chromophore. Those materials were well characterized by nuclear magnetic resonance, elemental analysis, absorption and fluorescence spectra, and cyclic voltammetry. The HOMO energy levels of these three copolymers locate within the range of -5.40~-5.33 eV which are greatly elevated compared with that of polyfluorene and match the work funtions of ITO and ITO/PEDOT:PSS (about 4.7 eV and 5.0 eV, respectively) better, indicating smaller hole-injection barrier. Polymeric light-emitting diodes (PLED) with the configuration of ITO/PEDOT:PSS(40 nm)/PFO-Cz-TPATST(80 nm)/CsF(1.5 nm)/Al(100 nm) and ITO/PEDOT:PSS(40 nm)/PFO-Cz-TPATST(80 nm)/1,3,5-tris(2-N-phenylbenzimidazolyl)benzene (TPBI) (30 nm)/CsF(1.5 nm)/Al(100 nm) were fabricated respectively. Highest luminous efficiency of 1.06 cd A^{-1} was achieved.

Keywords 1,1-dimethyl-3,4-di(triphenylamine)-2,5-dithienyl)silole; red-emitting conjugated copolymers; PLED.