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Synthesis and Applications of Bis(amino)distyrylbenzene Derivative for Organic Light-Emitting Diodes

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Abstract

Bis(amino)distyrylbenzene derivatives N,N,N',N',-tetraphenyl-2,5-di(E)-styrylbenzene-1,4-diamin (DASB), N,N,N',N'-Tetraphenyl-2,5-bis-(2-p-tolyl-vinyl)-benzene-1,4-diamin (DATB), 1,4-Dibromo-2,5-bis-[2-(4-methoxy-phenyl)-vinyl]-benzene (DAMB), 2,5-Bis-[2-(4-fluoro-phenyl)-vinyl]-N,N,N',N'-tetraphenyl-benzene-1,4-diamine (DAFB), 2,5-Bis-[2-(4-methoxy-phenyl)-vinyl]-N,N,N',N'-tetra-p-tolyl-benzene-1,4diamine (DTMB) were conveniently synthesized from the corresponding 1,4-dibromo-distyrylbenzene derivatives and diarylamine in the presence of $Pd(OAc)_2$, tri-*tert*-butylphosphine and potassium *tert*-butoxide in toluene. The physical properties of Bis(amino)distyrylbenzene derivatives were thoroughly investigated. Electroluminescent devices using DASB as the dopant emitters and host emitters were made . These devices all emit green light from the DASB emitter layer. Device **A** that consists of NPB (40 nm)/ DASB:Alq(5.3%, 30 nm)/TPBI (50 nm) shows the highest performance. The device emits green light at 518 nm with CIE values of (0.26, 0.59) and shows a maximum external quantum efficiency of 1.93 %, current efficiency of 6.58 cd/A, and brightness of 36795 cd/m^2

Keywords: Bis(arylquinoxalinyl)carbazole derivatives, blue emitter, electroluminescence, saturated blue light, organic light emitting diode