

聚物形成星狀高分子材料(POSS-P1~POSS-P3)可增加高分子材料的熱穩定性，並使其亮度及效率提升，對於高分子電激發光二極體材料方面提供了一個新的方向。



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Synthesis of Electro-optical Properties of Star-like Polyfluorene with a Silsesquioxane(POSS) Core

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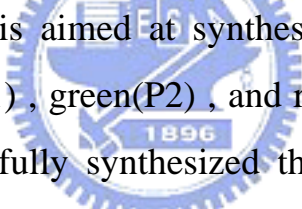
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Abstract



The goal of this study is aimed at synthesizing fluorene-based conjugated polymers that emit blue(P1) , green(P2) , and red(P3) light via Suzuki coupling method . We had successfully synthesized the star-like conjugated polymers (POSS-P1 ~ POSS-P3) by incorporating the silsesquioxane core into polyfluorene derivatives. The TGA and DSC data showed that the thermal decomposition temperatures (T_d) and glass transition temperatures (T_g) of POSS containing conjugated polyfluorene(POSS-P1 ~POSS-P3) are higher than those of the conjugated polyfluorene(P1~P3) without POSS core. All six polymers films were annealed at 200°C for 1 hr. The results demonstrated that the incorporation of the silsesquioxane core into the conjugated polymers could enhance the thermal stability of polymers, hence reduce the aggregation and keto defect. Two-layer light emitting devices with a simple ITO/PEDOT / polymer/Ca (Al) configuration were fabricated and characterized. The relevant results showed a maximum brightness of 1580 cd/m² (at a driving voltage of 15 V) and a maximum yield of 0.25 cd/A for POSS-P1, while a maximum

brightness of 3274 cd/m^2 (at a driving voltage of 11 V) and a maximum yield of 1.14 cd/A for POSS-P2, whereas POSS-P3 showed a maximum brightness of 1263 cd/m^2 (at a driving voltage of 16 V) and a maximum yield of 0.24 cd/A. Besides, we used the blending method to improve the devices properties. The maximum luminescence intensity and the maximum yield of all the star-like conjugated polymers with a silsequioxane core were better than those of conjugated polymers electroluminescent device. Hence the incorporation of the silesquioxane core into polyfluorene derivatives could provide a new methodology for preparing light-emitting diodes with significantly improved thermal stability and electroluminescent characteristics.



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