World Academy of Science, Engineering and Technology
International Journal of Chemical and Materials Engineering
Vol:16, No:07, 2022

Preparation of Hyperbranched Polymers for Application in Light Emitting Diodes

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Abstract : Emitting materials with thermally activated delayed fluorescence (TADF) properties as the third generation of organic light-emitting diodes (OLEDs) have received much attention as a modern class of highly efficient emitters because such properties enable the harvesting of both singlet and triplet excitons in EL applications without the doping with complexes of scarce noble metals such as platinum and iridium. Improved molecular design of TADF molecules and applied materials exhibiting internal electroluminescence (EL) with quantum efficiencies of nearly 100% has been achieved being. A2B3 hyperbranched polymers based on new derivatives containing silane core units serving as host materials for thermally activated delayed fluorescence (TADF) guest molecules have been designed and synthesized through several steps, including the synthesis of tetrakis(4-bromophenyl)silane, bis(4-(9H-carbazol-9-yl)phenyl)bis(4-bromophenyl)silane,bis(4-(9H-carbazol-9 yl)phenyl)bis(4-methoxyphenyl)silane and bis(4-(9H-carbazol-9-yl)phenyl)bis(4hydroxyphenyl)silane. This monomer has been used successfully used along with 1,1,1-tri-(p-tosyloxymethyl)-propane to prepare A2B3 hyperbranched polymers via step-growth polymerization. The characterization and the properties of these new host polymers will be presented and discussed in this contribution.

Keywords : carbazole, organic light emitting diodes, thermally activated delayed fluorescence, donor-acceptor, host and guest interaction
Conference Title : ICPCPS 2022 : International Conference on Polymer Chemistry and Polymer Synthesis
Conference Location : Singapore, Singapore
Conference Dates : July 12-13, 2022