SYNTHESIS AND FLUORESCENT PROPERTIES OF SYMMETRICAL BIS(DIPHENYLAMINO)-OLIGOPHENYLENEVINYLENES

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In recent years, there has been considerable progress in studying two-photon excited fluorescence due to a significant impact on diverse fields of technology - from material science and engineering to medicine. Two-photon excitation is used in various fields of technology, including optical microscopy, 3D data storage or electroluminescent devices. It also brings numerous benefits in fluorescence imagining or photodynamic therapy. Target dye molecules are synthesized with either electron acceptors or electron donors linked to the π-center. For symmetric molecules (A-π-A or D-π-D) the strength of the donor or acceptor and the conjugation length have a great impact on the nonlinear properties. A series of conjugated triphenylamine-based oligophenylenvinylenes was synthesized and studied for their high fluorescence in solution as well as in solid phase. [1,2]

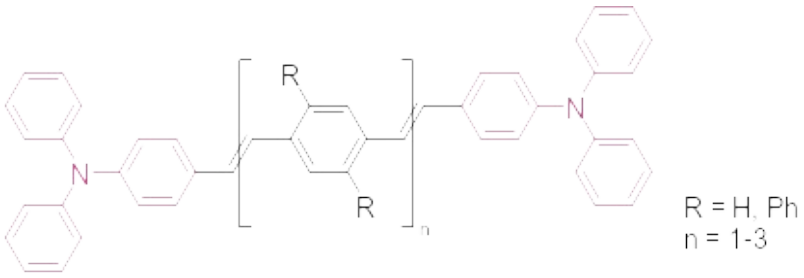

Figure 1: General structure of synthesized molecules.

Desired molecules were prepared successfully via Horner–Wadsworth–Emmons reaction of the appropriate phosphonate with the aromatic aldehydes. In each condensation only the thermodynamically favored *trans* alkene was formed. The optical behavior was studied in solid state and in various organic solvents by UV/Vis and emission spectroscopy. The excellent thermal stability was confirmed by using differential scanning calorimetry. In conclusion, all prepared compounds promise to be an attractive topic for further investigation and application in the field of optoelectronic devices.

Literature

[1] Redon, S.; Eucat, G.; Ipuy, M.; Jeanneau, E.; Gautier-Luneau, I.; Ibanez, A.; Andraud, C.; Bretonnière, Y. Tuning the Solid-State Emission of Small Push-Pull Dipolar Dyes to the Far-Red through Variation of the Electron-Acceptor Group. Dye. Pigment. 2018, 156, 116–132. https://doi.org/10.1016/j.dyepig.2018.03.049.

[2] Zhao X, Xue P, Wang K, Chen P, Zhang P, Lu R. Aggregation-induced emission oftriphenylamine substituted cyanostyrene derivatives. New J Chem. 2014, 38 (3), 1045–51. https://doi.org/10.1039/C3NJ01343J.