Building Blocks for the Future Devices:
The Synthesis of Chiral Perylene and Naphthalene Diimides

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The electronic and optical properties of organic semiconductors, now a well-established class of functional materials whose intriguing properties find application in a wide range of devices, are controlled both by the primary molecular structure and by supramolecular interactions. The successful design of supramolecular assemblies depends not only on the choice of suitable receptor units. An often underestimated aspect is the influence of the substituents of the building blocks, where even small changes can lead to unexpected consequences for the superstructure. The introduction of chirality in the superstructures improves the quality of the spatial orientation and packing of the building blocks [1].

The perylene dyes exhibit high fluorescence quantum yields, high photostability, thermal stability (higher than 550°C) and chemical inertness. On the other hand naphthalene diimides are effective in biological and medical areas as well as in supramolecular chemistry [2]. Two different chiral substituent containing perylene and naphthalene diimides have been synthesized and their chiroptical, photochemical, thermal and electrochemical properties examined for the use in a number of different areas. These include solar cells, optical switches and data storage, biological models for electron transfer, sensors, and supports for catalysis. The compounds characterized by UV-Vis, IR, Fluorescence Spectroscopy, NMR, DSC, TGA, CD and CV measurements.

References: