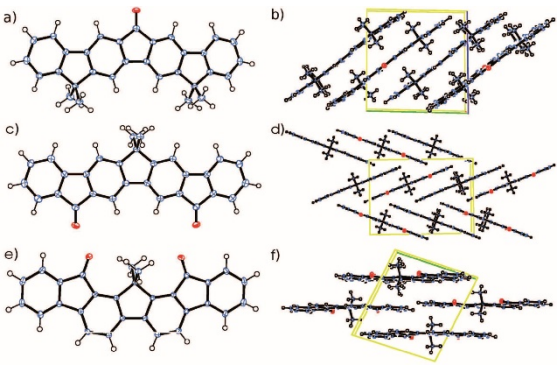
Spiro-Bridged Ladder-Type Oligo(*para*-phenylene)s: Fine Tuning Solid State Structure and Optical Properties

In this recent research highlight, the authors developed synthetic routes that allow to subsequently replace every pair of symmetry-equivalent alkyl groups in ladder-type quaterphenyl by a spiro-bifluorene group.

With an increasing number of spiro groups, the optical gap for absorption and emission slightly decreases, which is disadvantageous with respect to resonant energy transfer with ZnO. Thus, a synthetic route to a *para*-linked ladder-type quaterphenyl carrying all bridging units on one side of the ribbon was developed, which results in an in-plane bending of the *para*-phenylene. The optival gap increased compared to the linear molecule, however, the absorption coefficient slightly decreased.



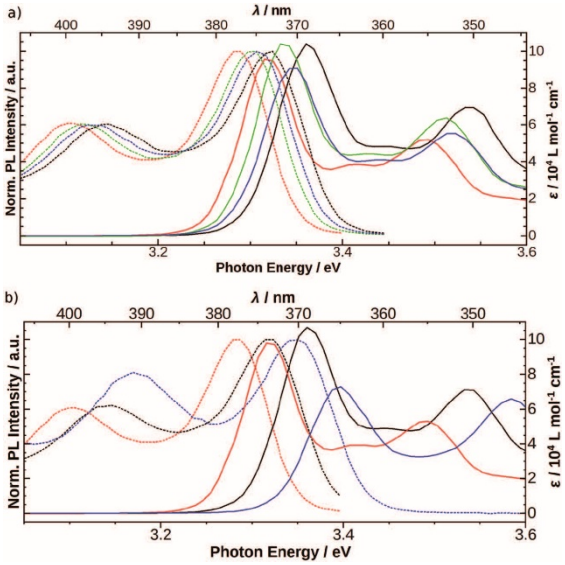
Asymmetric units (left) and arrangement of molecules in the crystal (right) of different molecule types. Thermal ellipsoids drawn at 50% probability level, cell edges marked in a: red, b: blue and c: green. For more details please see the publication text.

The authors analyzed the influence of different deposition techniques on the solid state structure by X-ray diffraction of single crystals obtained by crystallization from solution as well as sublimation.

In the cases of **L4P**-sp2 and **L4P**-sp3, it could even be shown that sublimation and crystallization from solution result in different crystal structures, of which the ones from sublimation are obviously more relevant in view of the typically employed vacuum deposition and might be advantageous in terms of application in light-emitting devices.

An increasing number of spiro-bifluorene substituents was found to aid thin-film formation on oxide surfaces, such that the optical properties could be preserved in pure, nondiluted thin films.

Finally, promising spiro-**L4P** derivatives have been employed in energy-transfer devices, for which highly efficient energy transfer from an inorganic quantum well to the organic layer followed by efficient light emission could successfully be demonstrated.



Absorption (solid lines) and normalized PL (dotted) spectra of final products 10^{-6} - 10^{-5} mol L^{-1} in CH_2Cl_2. For more details please see the publication text.

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