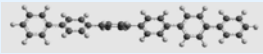
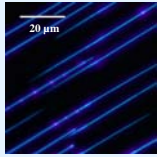


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Organic nanofibers



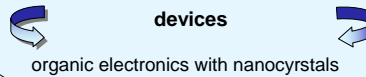
dipole assisted self-assembly of needle-shaped aggregates

- polarised luminescence
- waveguiding properties



Concept

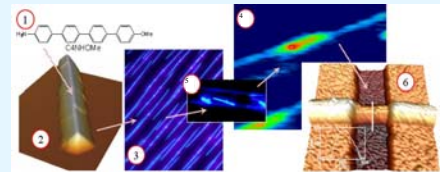
Organic molecules are the most efficient light emitters and converters: Ordered organic molecules (single crystals) result in best performance of devices



Functionalization: full flexibility

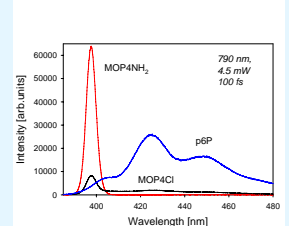
- 1 - synthesis of molecules with specific functions
- 2 - controlled growth of nanoscaled aggregates
- 3 - multiplication of optimized aggregates via self assembly
- 4 - (near field) optical characterization
- 5 - transfer and manipulation
- 6 - contacting and device integration

concept

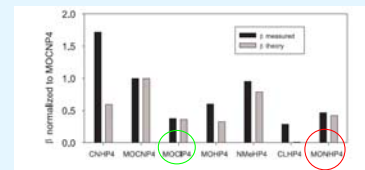


example:

nanofiber frequency doublers, grown from tailored, functionalized p4P molecules

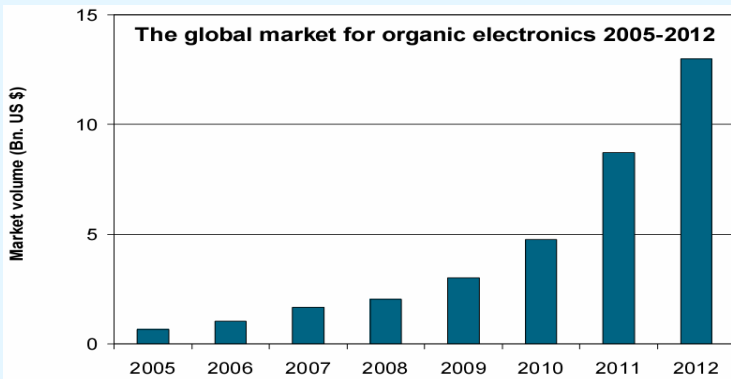


further optimization ...



Market potential

The global market for organic electronics 2005-2012



Source: IDTechEx

Advantages

- compatibility with plastic substrates
- low temperatures during manufacturing (60° - 120°C)
- easy integration
- low costs and cheap deposition processes such as spin-coating, printing and evaporation
- organic molecules include the advantages of polymers but are much more efficient

Expertise and portfolio

Nano Center South:
 Class 100 cleanroom facility (semiconductor processing)
 photonics (pulsed, cw lasers, spectroscopy)
 UHV technology
 Surface Science and Thin Film Growth
 Mathematical modeling



www.nanosyd.sdu.dk

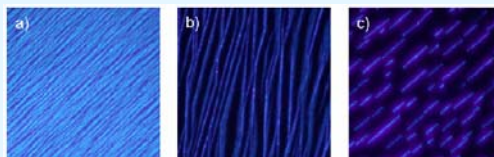
"New organic nanostructures for next generation devices", K.Al-Shamery, H.-G. Rubahn, H.Sitter, Eds., Springer Series in Materials Science 101, Berlin (2008).

"Organic molecular nanotechnology", Concept paper M.Schiek, F. Balzer, J.Brewer, K.Al-Shamery and H.-G.Rubahn, SMALL, 4(2008).

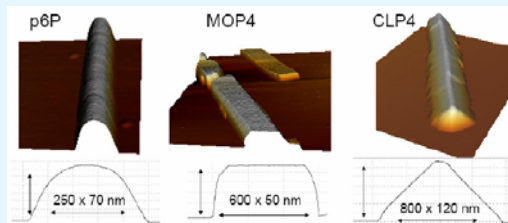


Nanofibers

planar with the substrate

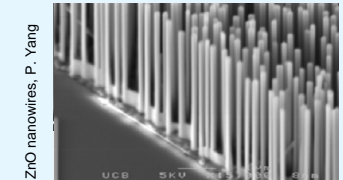
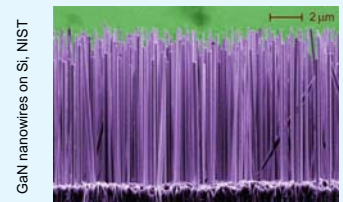


Fluorescence microscopy images (85 x 85 µm²) of p6P (a), MOP4 (b) and CLP4 (c) fibers on muscovite mica after UV excitation (365 nm).



Atomic force microscopy images.

and perpendicular to the substrate



Nanofibers are single crystalline, can easily be integrated, can be manufactured with high reproducibility and cheap, and their optoelectronic properties can be tailored to a large degree. They are likely to be found in future photonic devices such as solar cells (light harvesting aggregates).