Semiconducting Starmesogens consisting of Subphthalocyanine Cores and Benzothienobenzothiophene/Oligothiophene Arms

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Subphthalocyanines (SubPc) **1** belong to a class of compounds intensely studied. This is owed to their application as non-fullerene acceptor for photovoltaic applications. [1] SubPc based liquid crystals can be aligned in the electric field and form highly polar columnar phases. [2] Such phases have been demonstrated to show the bulk photovoltaic effect.[3] This turns SubPc-based structures into attractive targets for materials science. Therefore, we became interested in umbrella-shaped SubPc star mesogens with oligothiophene arms (**2**). The strong SHG signal for these materials in the columnar phases can be explained by the generation of parallel dimers, in which the dipoles point along the columnar axis. [4] TOF mobility is in the range of $5*10^{-3}$ $cm^2V^{-1}s^{-1}$. In the search for novel materials for organic electronics, we combine the SubPc core with benzothienobenzothiophene (BTBT) arms, as BTBT frameworks are among the best semiconductors known to date. [5]
Herein we present the challenging, successful synthesis of non-symmetric BTBT derivatives tailored for cross-coupling with the SubPC core via different linking units, resulting in target mesogens **3**-**5**. The impact of these units on thermotropic properties and the mesophase structure is studied by polarised optical microscopy (POM), differential scanning calorimetry (DSC) and X-ray scattering (XRS).

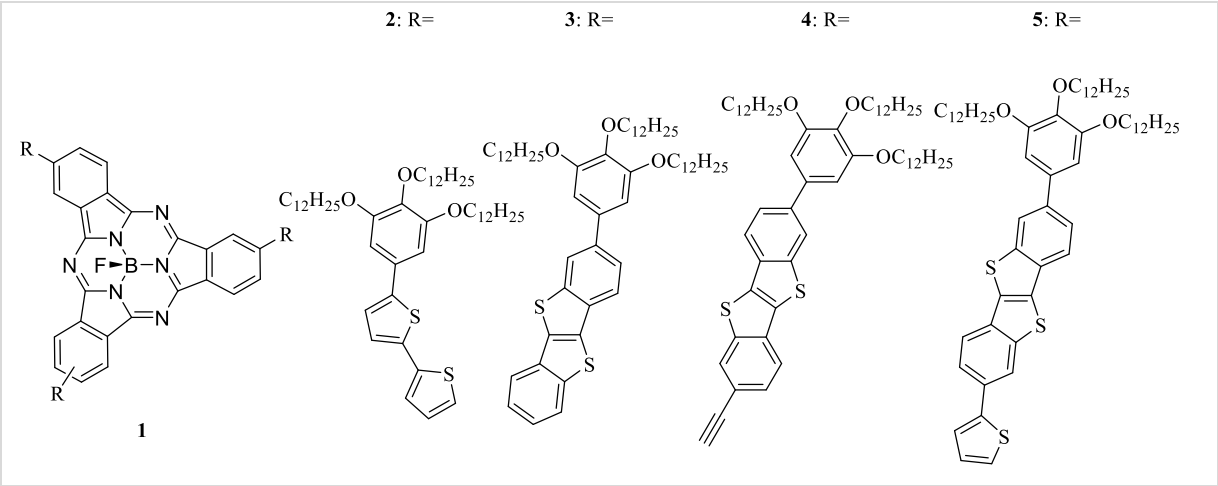

Figure 1: Structure of three different SubPC star mesogenes

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