Project 2.3 Donor-acceptor-doped acenes and cyclacenes

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Background:

The PhD student will conduct the synthesis of cyclacene analogs doped with donor and acceptor heteroatoms, in particular: synthesis of building blocks and macrocyclic precursors, purification of products, full chemical, spectral, and photophysical characterization of the obtained products, documentation of the experiments, and participation in the preparation of scientific publications.

Aim:

The aim of the project is to synthesize and investigate the properties of stable analogs of acenes and cyclacenes doped with donor and acceptor atoms. The resulting analogs would retain the key structural and electronic advantages of the starting acenes while exhibiting high stability in both the solution and solid state. In addition to stability, the new molecules should have highly favorable optoelectronic properties, which is particularly important from the perspective of their potential applications: narrow band gap, near-infrared light absorption/emission, and adjustable energy difference between the singlet and triplet states.

Requirements:

- A PhD student should hold a Master degree in chemistry and have experience in working in an organic chemistry laboratory,
- he/she should also have a broad knowledge in the modern synthetic methodology and be familiar with spectroscopic techniques used to characterize the organic compounds (NMR and MS),
- an additional advantage will be the experience in the synthesis of polycyclic aromatic compounds, dyes, or macrocycles, and the knowledge of quantum chemical calculation methods (DFT)