Nowadays we are experiencing a constant and rapid development of new technologies. Every day scientists look for innovative solutions that will improve and facilitate everyday life. That is why it is so important to develop continuously the state of knowledge and search for unconventional solutions. One of the scientific fields, which despite a huge amount of data is constantly improved is optoelectronics. However, technological development is only possible if there is continuous scientific progress based on basic research. The capabilities offered to us by the organic chemistry in the synthetic field are practically limitless, we are limited only by our own imagination. That is why it is so important to keep searching for new organic molecules that will have the expected properties.

Small, organic chemical compounds have been successfully used in the field called "molecular electronics", where the fundamental properties are based on the transfer of electrons inside the molecules. The combination of organic fragments in the form of ring-shaped condensed systems allows to produce structures where electron transfer is optimized. Such structures where electrons easily pass from one end to the other are so-called "push-pull" compounds, or in other words bipolar compound. In such molecules at two ends there are groups which are donors and acceptors of electrons, which makes electron transfer more effective. The processes of light absorption and emission are based on the electron phenomena occurring inside the particle. Therefore, organic compounds, in which the distribution and behaviour of electrons is of great importance, have been intensively tested, *inter alia*, in light-emitting diodes or photovoltaics. That is why it is so important to design, obtain and test organic coupled systems.

In this project, new condensed polycyclic hydrocarbon systems will be obtained, doped with heteroatoms - sulphur and nitrogen. The concept of introducing heteroatoms is well known in organic semiconductor technology. Our project aims at obtaining whole groups of compounds with a variable bipolar nature. By using quantum chemistry methods, just before the synthesis, we will be able to predict the basic physicochemical properties of the produced materials. Certainly not all properties can be calculated, that is why it will be so important to develop an in-depth characteristics of the final compounds.

All received heteroaromatic condensed D-A and D-π-A systems will be tested comprehensively. An invaluable deliverable of this project will be learning the structure-property relationship of the produced materials. Their optical (absorption, photoluminescence), thermal or electrochemical properties will be determined. The produced functional materials will be prototypes of devices - electro-luminescent diodes (OLEDs), organic solar cells (of BHJ and DSSC types) and will be used as active materials in field-effect transistors (FET).

Designing, synthesizing, researching or constructing prototypes of devices makes the project interdisciplinary - on the borderline of chemistry, physics and materials chemistry. The authors of the project belong to the group of interdisciplinary researchers, we personally believe that research from the borderline of scientific fields is the most developing and extremely fascinating.