During the past twenty years, there has been a significant increase of interest in five-membered heterocyclic compounds to which belong 1,3,4-oxadiazole, 1,3,4-thiadiazole and 1,2,4-triazole. These non-naturally occurring systems exhibit a wide range of applications in many industries. These hybrids are particular interesting due to presented properties of photoluminescence. An optimised organic luminophore is usually an extended π-conjugated chromophore system showing the proper electron-hole transporting properties, a high external quantum efficiency and both thermal and chemical stability.

Earlier research shown that the use of the 1,3,4-oxadiazole and 1,3,4-thiadiazole core as the central unit allows to obtain organic hybrid characterized by very high fluorescence quantum yield as high as 91%. Unfortunately, the resulting compounds did not undergo electropolymerization, probably due to the low solubility of the monomers.

This begs the question, if you can get structurally similar compounds, so that they are still characterized by a high fluorescence quantum yields, and while doing so modify them to their solubility improved significantly? The problem of limited solubility may be stave using *N*-substituted 1,2,4-triazole as a central unit, the use of alkyl substituents on the nitrogen atom should significantly improve the solubility of the final compounds. Additionally, in this way, the nature of mers will be maintained - compounds should be characterized by high quantum yields of fluorescence. The aim of the project is to investigate the synthesis and properties of new, aromatic systems containing *N*-alkyl substituted 1,2,4-triazole core as a central unit.

Four leading heterocyclic scaffolds will play the essential role in the synthesis of the desirable arrangements. These are *N*-ethyl-1,2,4-triazole, *N*-propyl-1,2,4-triazole, *N*-butyl-1,2,4-triazole and *N*-hexyl-1,2,4-triazole substituted symmetrically with bromophenyl groups. The modified diazole units will be treated with the selected boronic acids in the presence of the adequately selected catalyst from the family of palladium catalysts and appropriate bases in order to study their reactivity under Suzuki coupling conditions. We will focus on the elaboration of easy and efficient synthetic protocols of the extended organic hybrids possessing delocalized unsaturated multiple bonds.

The proposed structure could be used as monomers for applications in molecular electronics - innovative science twenty-first century. Chemicals electrically conductive - mainly polymers occupy already commonly used silicon. The use of such groups makes it possible not only to increase the speed and efficiency of electric appliances but also, and perhaps above all, a far-reaching miniaturization of electronic components. Hence electronic circuits can be printed, also on flexible substrates, using the printing presses. With this solution there is no need to invest in expensive production lines for this type of technology. TV screens or computer can be produced in a flexible, collapsible into a roll on a pencil. Photovoltaic cells can occur in the form of a stretched film on roofs or walls.

For synthesized compounds spectroscopy and electrochemical measurements are going to be carried out. Modifying the structure of lead compounds based on the results of the research should lead to bet on the best systems to the construction of high-performance light emitting devices. An important element is the receipt of such mers so that they are thermally and chemically stable and that were characterized by their high fluorescence quantum yield coefficients. For such systems to be expected at the same light yield a significant reduction in electricity consumption. Straighter - the same amount of light is emitted while consuming less energy. To sum up the project involves the synthesis of a group of organic compounds with potential use in optoelectronics, which may contribute not only to improve comfort of living - production of flexible electronic devices, but also quality of life. Broadening the scope of applicability of photovoltaic cells as an alternative source of energy, reduce the formation of carbon dioxide and reducing electricity consumption through the use of modern, organic light emitting diodes (OLED) also fits the theme of environmental protection.