

Double C–H Bond Activation: A New Tool For Synthesis Of Extensively Conjugated Oligopyrrole Materials

Principal Investigator: lic. Liliia Moshniaha

Research Advisor: prof. dr hab. Marcin Stepień

Fused heteroaromatic molecules play a very important role as semiconductors for organic electronics and as functional dyes for a variety of applications. Such molecules contain multiple rings built of carbon atoms and contain additional elements, such as nitrogen. Because these rings are connected (fused) to form two-dimensional networks, the molecules resemble the graphene sheet, and may display similar properties. Very often, such molecules are colored and fluorescent and can be used for various applications, for instance as sensors.

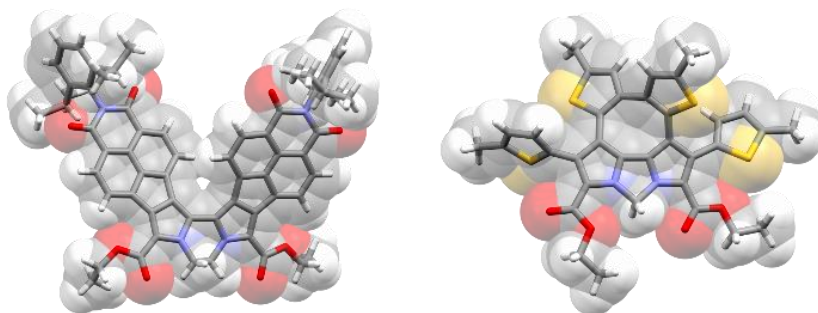


Figure 1. Molecules that can be synthesized using our method.

We recently used a new method of synthesizing such molecules, based on so-called “double C–H bond activation,” which uses palladium and silver compounds to close selected rings in the molecule. This method is interesting because it is efficient and because we do not need to activate the reacting positions in the starting materials. Now, we plan to make more complex molecules using this reaction, looking for interesting and useful optical properties. We also hope that our investigations will help us better understand how the activation reaction works.



Figure 2. Our compounds change colors when dissolved in solvents of varying polarity: toluene (T), dichloromethane (D), and methanol (M).