SYNTHESIS OF NEAR-IR SENSITIZERS FOR ORGANIC ELECTRONICS

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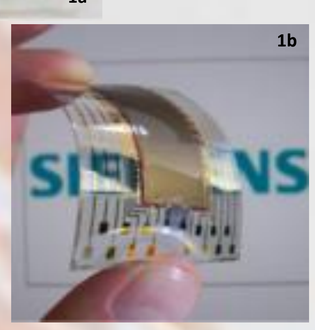
I.INTRODUCTION

Increasing efficiency is a main issue in all types of optoelectronic devices such as OSCs (organic solar cells), OLEDs (organic light emitting diodes), OFETs (Organic field effect transistors), photo-detectors and sensors. Chemistry issues toward such improvements include tuning of basic properties of organic semiconductor such as absorption and emission etc. For some practical applications (e.g. in photo-detectors) , the materials should not only have good light harvesting capability in the UV/VIS spectral range but also in the NIR region due to the extension of the solar spectrum into the NIR.
The ITN project OSNIRO is focused on synthesis, characterization and application of NIR absorbing and emitting organic materials for application in optoelectronic devices by following an interdisciplinary approach.

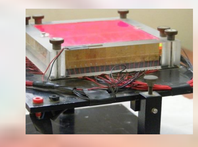


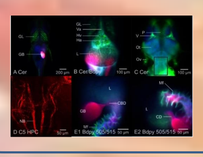
Partners of OSNIRO

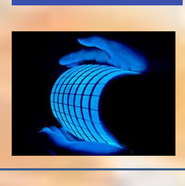
II. RESEARCH FOCUS

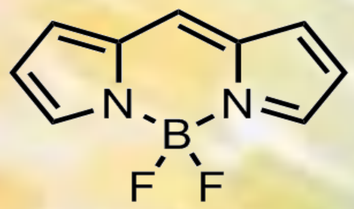
In our research project we focuses on synthesis of small molecule–type NIR dyes and their incorporation into linear and hyperbranched polymers.
Extending the sensitivity into the NIR region promises an improved performance of photovoltaic devices , especially photosensors.

4,4-difluoro-4-bora-3a,4a-diaza-s-indacene (BODIPY) dye and its derivatives attract great attention due to their strong absorption the UV/VIS and narrow fluorescence emission with high quantum yield[2]. In addition, this dye family shows a high thermal and photochemical stability[3]. These remarkable properties lead to important applications in luminescent devices[4], chemical sensors[5], biolabelling[6] and other optoelectronic devices[7]. Therefore; we are focussing on BODIPY-based target compounds in the first phase of the OSNIRO project.



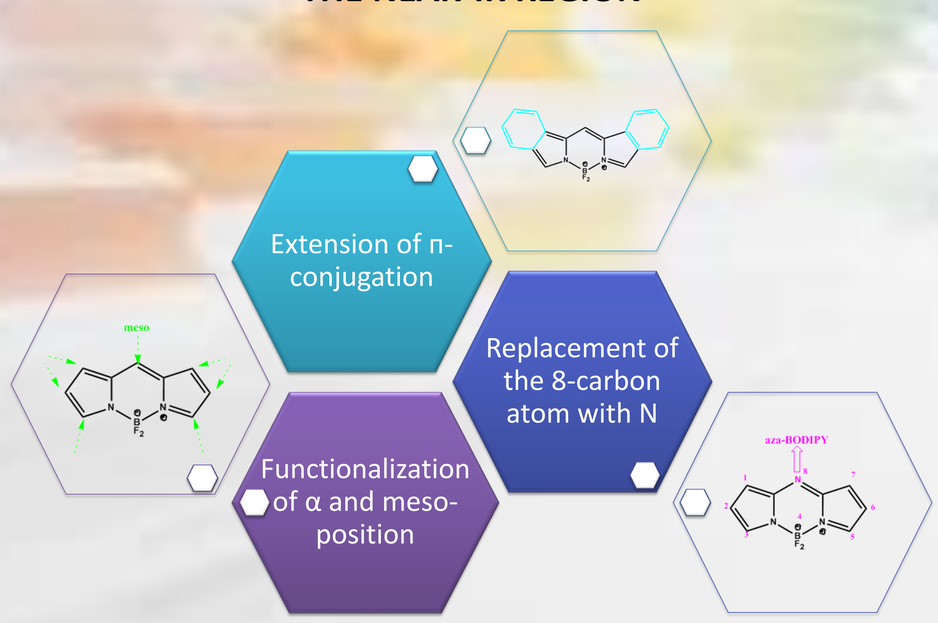




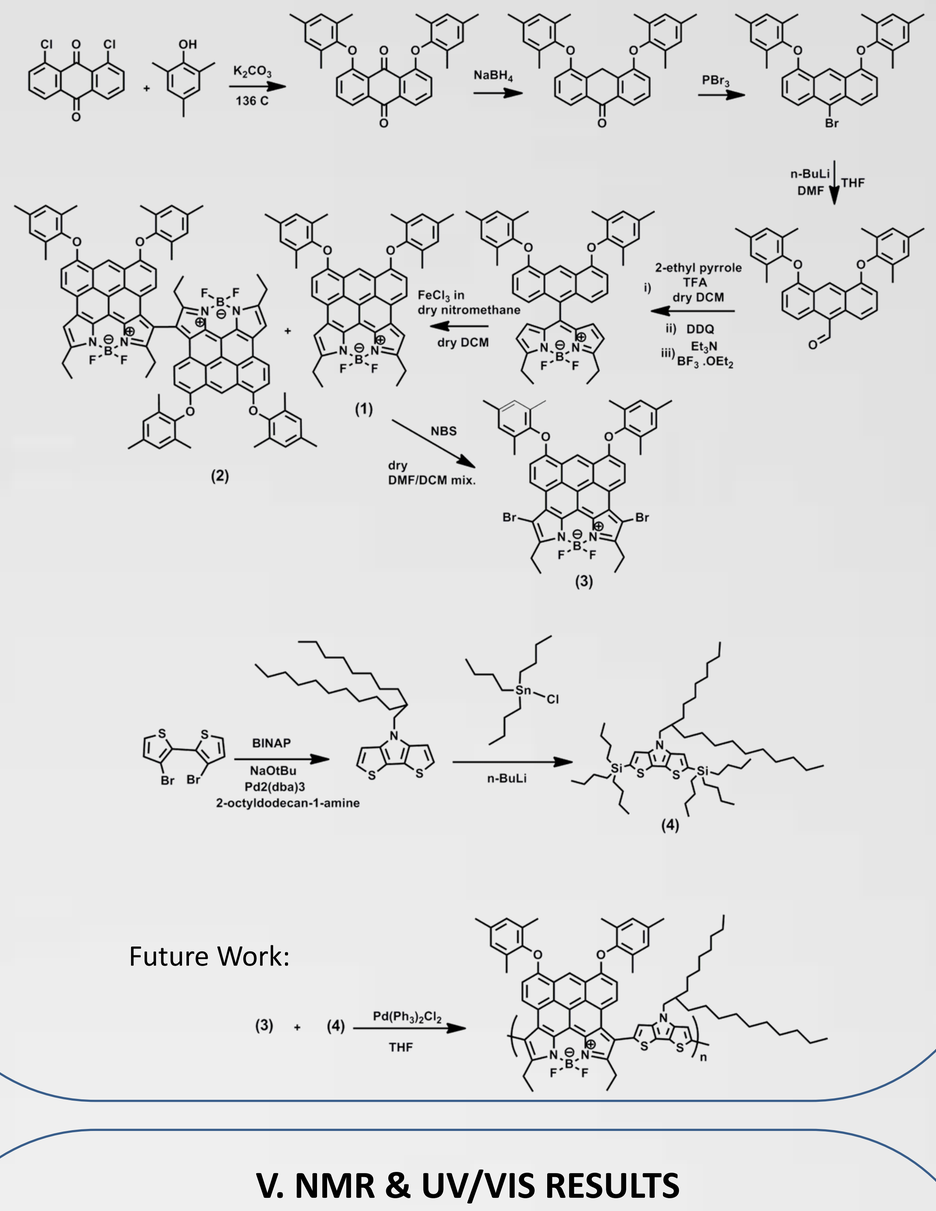


BODIPY

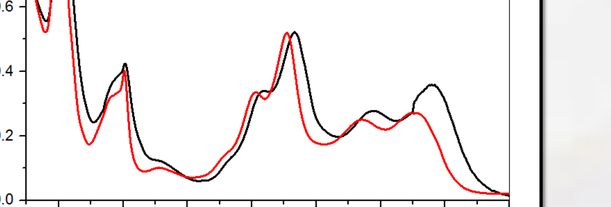
III. STRATEGIES FOR EXTENDING ABSORPTION AND EMISSION INTO THE NEAR-IR REGION[8]



IV. SYNTHETIC PATHWAY [9]



Future Work:



V. NMR & UV/VIS RESULTS

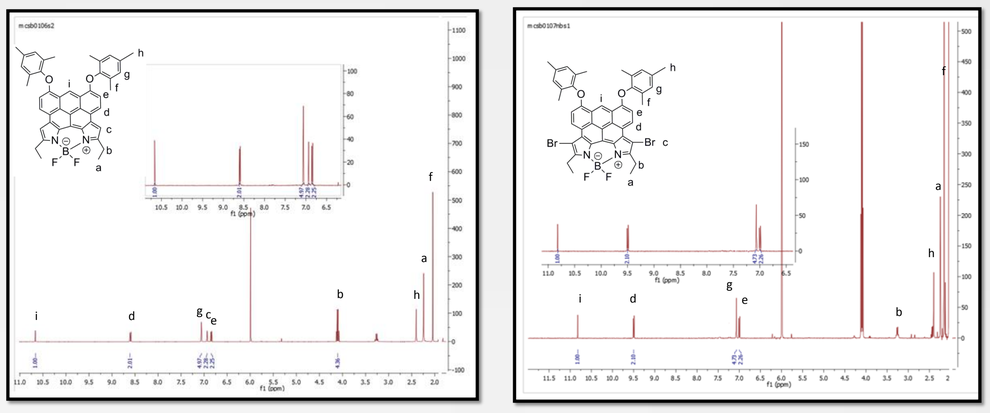


Figure1. ^{1}H-NMR of BODIPY derivative (3) and (4) in $CDCl_3$ at 600 MHz

Figure2. The absorption spectra of BODIPY derivative (3) and (4) in $CHCl_3$ solution and thin film on quartz

VI.ACKNOWLEDGEMENT

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VII. REFERENCES

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