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# Synthesis and investigation of new organic semiconductors containing 1,4,5,8-naphthalenetetracarboxylic diimide central fragment

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Nowadays energy consumption is growing at a substantial rate. The conversion of sunlight into electricity is one of the most promising studies to meet the increasing energy demands for future generations without the negative impact on the global climate. One of the most attractive alternatives are photovoltaic systems, which uses sunlight as free and endless energy source [1].

The organic electron transporting materials (ETM) are very important components in perovskite solar cells (PSCs) and play a significant role in extracting and transporting photogenerated electrons while simultaneously serving as a hole blocking layer [2]. Fullerenes and their derivatives are considered as one of the best n-type organic semiconductors and are often used in PSCs. Unfortunately, these compounds show some disadvantages (e. g. they are expensive), which limit their application [3].

The aim of this work – to synthesize new electron transporting materials with 1,4,5,8-naphthalenetetracarboxylic diimide central fragment containing pentafluorophenyl and pyridine groups. Pentafluorophenyl fragment was used as a protecting group to increase perovskite moisture resistance, while pyridine moiety reduces surface defects of the perovskite layer.

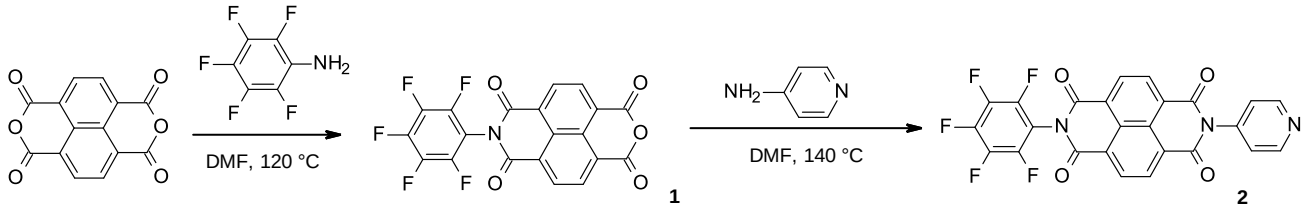


**Fig. 1**. Synthesis of the compound **2**

From the obtained results it was confirmed that functional pentafluorophenyl group improved the stability of perovskite. There are some preliminary results of these electron transporting materials and further investigation is being done.

REFERENCES

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