SYNTHESIS AND PROPERTIES OF ENAMINE BASED HOLE TRANSPORTING MATERIALS CONTAINING OXYGROUPS

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Recently, as the world's population is growing, energy consumption is growing rapidly too. Most energy sources (oil, natural gas) pollute the environment, and we should look for ways to improve the efficiency of renewable energy sources. One of the most promising, environmentally friendly types of energy is the solar radiation [1]. In order to convert solar radiation to electricity solar cells were constructed. One of the main components of solar cells is the hole transporting material [2]. The aim of this work is to synthesize 3,4-methylenedioxy aniline-based semiconductors, that could be used as a hole transporting material in solar cells, and estimate the influence of oxy and methoxy groups on the properties of these enamines.

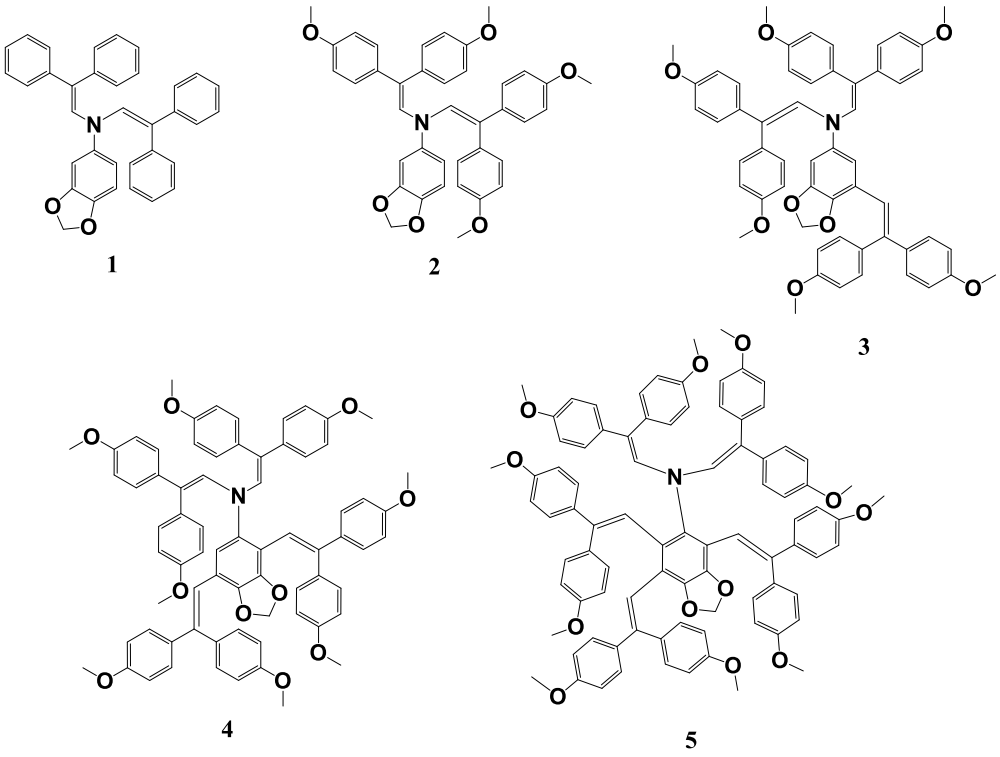

Fig. 1. Structures of new enamine derivatives.

During this work new enamine class compounds were synthesized **1-5**. From investigated optical properties, it is evident that all compounds have three maximum absorption peaks between 246 and 395 nm, which location depends on the number and position of methoxy groups. The synthesized compounds exhibit amorphous nature with a high glass transition temperature, a good solubility, and decent thermal stability (greater than 280 °C). It has been observed that ionization potential (5,19 – 5,31 eV) and hole drift mobility values (up to $3{,}63 \cdot 10^{-5}$ $cm^2/V \cdot s$) of all compounds (except enamine without methoxy groups) is favorable for the use in solar cells as positive charge carriers. However more than three 2,2-bis(4-methoxyphenyl)ethenyl groups in compounds **4**, **5** does not make any possitive influence on photoelectric properties.

[1] H. S. Rauschenbach, Solar Cell Array Design Handbook : The Principles and Technology of Photovoltaic Energy Conversion, ISBN 978-94-011-7915-7, (1980).
[2] L. Calio et al. Hole-Transport Materials for Perovskite Solar Cells. *Angewande Chemie International Edition* 55, 14522–14545 (2016).