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SYNTHESIS AND CHARACTERIZATION OF SEMICONDUCTING CARBAZOLE THIN FILMS

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There are an active search and synthesis of new organic compounds with special semiconducting characteristics at present. It is very perspective field of research. For example, the market for organic light-emitting diode (OLED) displays has grown rapidly and has started to challenge LCDs in all applications, especially in the small-sized display market [1]. And of cause every OLED contains organic semiconductors, what we are going to research. One of the basic parameters of semiconductor materials is a charge carrier mobility that determines a type of conductor and its electrical properties.

The main goal of this study is characteristics determination of synthesized organic compounds for designing electronic components as organics diodes and transistors.

As a first step, semiconductor films were made from various organic compounds for the further research. The deposition of 5,11-dihexyl-5,11-dihydroindolo carbazole, 5,11-dimethyl-5,11-dihydroindolo and other groups of carbazole films were performed. Those materials have different evaporation temperature that leads to using various samples syntheses methods. The organics films were synthesized by using two well-known methods such as thermo vacuum evaporation [2,3] and spin coating [4] methods. The each method requires special preparing of substrate, time processing and the other features. The examples of synthesized thin films samples are presented in Fig. 1.

The surface morphology of synthesized samples was investigated using electronic spectroscopy technique. Then semiconductor component were examined by luminescence and optical spectroscopy techniques. The results of the investigations will be described in this study.

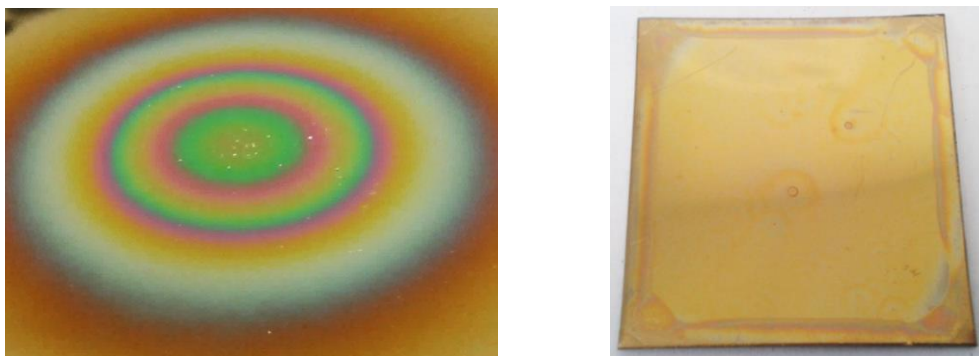


Fig.1. The films of organic compounds getting by thermo vacuum evaporation method (left) and spin coating method (right)

Finally, it is found that the semiconductor in the some synthesized samples has a hole conductivity. The charge carrier mobility was determined by measurements volt-ampere characteristics. As the result of this study we will review the semiconductor properties of organic compounds synthesized by thermo vacuum evaporation and spin coating methods.

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