

Summary of doctoral thesis

Title „ Luminescent systems with a fluorene and carbazole motifs: synthesis and photophysical properties ”

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Dynamic technological progress - being an inherent element of the developing society - is a kind of driving force in case of the search for new, innovative materials that are able to successfully cope with the ever-growing requirements created in the world of modern electronics.

The possibility of making series of structural modifications within a large group of known organic motifs makes the organic electronics (based on organic electroactive compounds) an unrivalled method when talking about the creation of functional materials with strictly defined physical and chemical properties (optical, electrical, magnetic and other).

Nowadays, constructed electronic components, based on low molecular weight or polymeric electroactive organic materials, become a clear competition in relation to technology based on inorganic semiconductors (mainly silicon). The current trend is definitely caused by the expectations of XXI century electronics. Especially significant miniaturization, flexibility (forming any shape), a certain degree of transparency as well as increased performance and quality parameters of newly created electronic devices.

However, organic electronics, despite many benefits and the commercial implementation of numerous of organic components (OLED, OPV, OFET) is not without disadvantages. The fundamental problem invariably remaining to be solved in the described technology is the broadly understood stability of organic layers (morphological, electrochemical, thermal, optical or environmental). In the discussed issue, the parameters that constantly require improvement are also the low-efficiency and low energy-saving of the constructed devices. It means that further research is still ongoing (based on the designing and then synthesis) and the continuation of search for new organic molecular or polymer compounds with improved utilization parameters is required.

Among the numerous group of well-known organic motifs, fluorene and carbazole are interesting aromatic systems, which are readily used in the synthesis of both molecular and polymeric luminescent materials. The reason of the interest of the researchers in derivatives containing the fluorene and carbazole motifs are noteworthy physico-chemical properties of the described compounds, including in particular optical and thermal ones, as well as the relatively easy to modify the fluorene and carbazole motif towards the designed materials with the expected properties.

This work concerns the synthesis and determination of selected photophysical properties of new luminescent molecular materials containing fluorene and/or carbazole motif(s).