

Streszczenie rozprawy doktorskiej pt. *Synthesis and investigation of application properties of luminescent salicylaldehyde azines*

Many organic luminophores exhibit intense emission across the entire visible light spectrum, which allows for wide applications of these compounds mainly in life sciences as fluorescent markers and biological probes, and most importantly in the production of organic optoelectronic devices, thin-film transistors and fluorescent sensors.

This work is of an interdisciplinary nature and presents an overview of the library of new compounds belonging to the group of salicylaldehyde azines, starting from the methods of synthesizing molecules of this type, through physicochemical properties resulting from their structure, and ending with application possibilities.

The azine synthesis path is based in the first part on modifications of salicylaldehyde using popular alkylation reactions of the hydroxyl group and Suzuki-Miyaura and Buchwald-Hartwig couplings. The second part concerns the addition reaction of hydrazine in the form of hydrazine hydrate to an appropriately modified aldehyde molecule to obtain both symmetric and nonsymmetric azines of salicylaldehyde. Azines exhibit luminescent properties and are characterized by two effects, i.e., photoinduced ultrafast proton transfer in a solid state (ESIPT) and aggregation-induced emission enhancement (AIE). Thanks to their unique properties, azines can find a few applications, including as fluorescent tags showing biological activity, or emission layers in OLED diodes. Biological studies for azines have been conducted on popular cancer lines such as HeLa and HT29. To use a chemical compound in organic electronics, it is usually necessary to produce a thin layer of a solid from it. Therefore, a full analysis of the physicochemical properties and optimization of the process conditions for obtaining thin films was carried out, as a result of which three azines were selected for which OLEDs were successfully produced.