

# Photophysical properties of dimethildihydropyrene derivatives

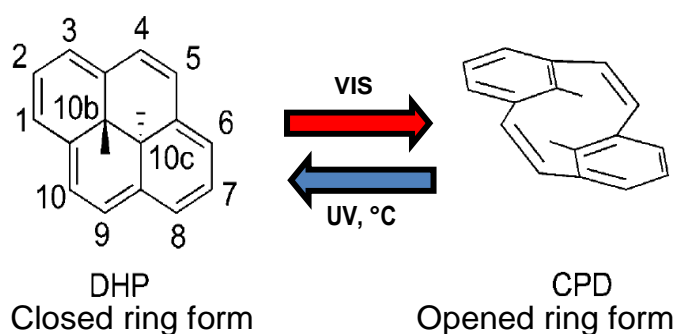
Ignas Čiplys<sup>1</sup>, Irena Kulszewicz-Bajer<sup>2</sup>, Renata Karpicz<sup>1</sup>

<sup>1</sup>Center for Physical Sciences and Technology, Sauletekio ave. 3, LT-10257 Vilnius, Lithuania

<sup>2</sup>Warsaw University of Technology, ul. Noakowskiego 3, 00-664 Warsaw, Poland

Email: [renata.karpicz@ftmc.lt](mailto:renata.karpicz@ftmc.lt)

Dimethildihydropyrenes (DHP, closed ring form) are one of the most popular photochromic compounds class that could be reversibly converted into cyclophanediene (CPD, opened ring form) when exposed to visible light (above 480nm). This kind of photochemical reactions leads to changes in physical properties such as absorption and fluorescence spectra. DHP substances could be applied in wide range of areas such as organic electronics, for example single molecule memory elements, and biology – diagnostics, control of metabolic reactions. To achieve even more suitable physical properties for different applications, DHP molecules could be modified by adding substitutes. However, the most common problems of DHP compounds are stability, conversion efficiency and thermal back reaction. To solve this problem, there is a need of deeper understanding of processes appearing during DHP↔CPD photochemical reactions.



New derivatives of DHP were synthesized and its optical properties of both CPD and DHP forms as well as excited state dynamic were investigated in the solutions. We focus on the emissive properties of DHP derivatives with the possibility to switch them between fluorescent and non-fluorescent states. It was found out, that only antisymmetric DHP shows good photochromic properties. During the first 100-300 ps after excitation under visible light the closed-ring DHP isomer were opened. Reverse transformation took place through intermediate stage during several nanoseconds.