



## Photoactive Polymers and Composites

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**Abstract:** Photoactive polymers and composites belong to the favorite materials for designing and assembling “intelligent” devices such as electrochromic and photochromic windows, organic solar cells, organic light emitting diodes and molecular machines. Photoprocesses occurring in these

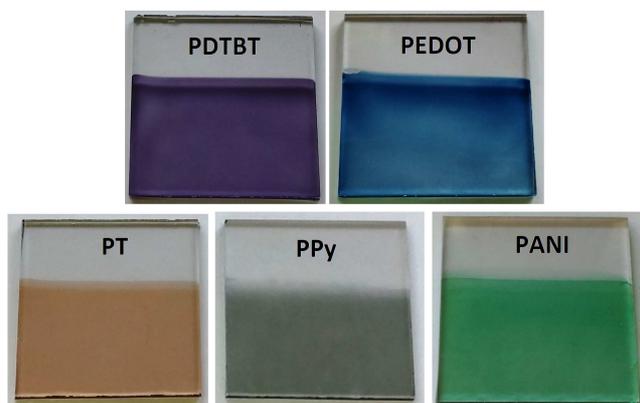


Fig. 1. Electrochromic polymers [3]

materials are *par excellence* suitable for communicating basic concepts of chemistry, physics and related material sciences in close combination with convincing applications from science and technology in the 21<sup>st</sup> century. In order to get a high degree of motivation for students and to make the elementary steps of processes occurring on the molecular level, meaningful experiments and scientifically consistent teaching concepts are needed.

The lecture will give an overview on photoactive polymers and composites emphasizing experimental approaches for

teaching purposes. Starting from the fundamental idea, that the electronically excited states of molecules are the “heart” of all photoprocesses, photo-, solvato- and electrochromism as well as photo- and electroluminescence will be compared with to each other. Examples of experiments will be given for demonstrating similarities and differences between these phenomena. During the course of the lecture further materials and experiments for an organic photovoltaic cell using a semiconducting polymer and a fullerene derivative as well as an “intelligent” foil with a molecular switch embedded in a polymer matrix will be shown and used for explaining the functional principles and the challenges for materials in order to improve the performance of such devices.

### Selective references:

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