

Subarea POB3: Zaawansowane metody modyfikacji powierzchni materiałów**Title of the presentation: Photoactive organic layers: deposition, characterization and application****Author:**

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Abstract:

Singlet oxygen, $^1\text{O}_2$, was discovered in 1924, but it has been under high research interest only since 1963. This form of oxygen possesses stronger oxidizing properties compared to oxygen in the triplet state. As a result, singlet oxygen shows higher reactivity than triplet oxygen, but also, consequently, has much shorter lifetime (in the order of μs). Hence, it has to be generated *in situ*. In recent years, much attention has been paid to the possibility of immobilizing molecules capable of photosensitization of singlet oxygen. Recent studies show that immobilized photoactive molecules may exhibit greater photostability and a lower degree of unfavourable oligomerization / aggregation. It should be noted that in many cases only a thin photoactive layer applied to the solid support provides sufficient photogeneration efficiency for the $^1\text{O}_2$ molecule. Thanks to its electrophilic properties, singlet oxygen reacts with unsaturated carbon-carbon bonds, neutral nucleophiles or anions, which makes it interesting for use in the synthesis of fine chemicals, water purification or in Photodynamic Therapy (PDT). The use of singlet oxygen as an oxidizing agent in the synthesis usually results in an increase in the efficiency and selectivity of the reaction, and additionally, the use of solar energy as an “activation” allows for a significant reduction in the cost of the process. Additionally, singlet oxygen has been shown to have strong bactericidal properties. Recently, the possibility of using of organic photoactive layers as antibacterial coatings has been widely studied. The main goal of the presented research is to develop an effective method of producing photoactive materials on solid supports that can be used as a source of singlet oxygen in oxidation reactions used in e.g. fine chemical synthesis or as antibacterial coatings.