

DESCRIPTION FOR THE GENERAL PUBLIC (IN ENGLISH)

The photocatalysis is quickly developing the scientific field. Already soon self-cleaning surfaces (for example windows panels), where application finds the photocatalysis phenomena, will be in every house. The photocatalysis is the phenomena initiated by electromagnetic radiation. Photocatalysis for daily use focuses on the visible light. The substances used in the photocatalysis are called photocatalyst. Upon exposure to incident electromagnetic radiation the photocatalyst can decompose the pollutants from water, indirectly creating the active hydroxyl and oxygen radicals. In the photocatalytic process the active radicals formed by contact with the organic molecules decomposed those molecules to small, non-toxic inorganic particles, for example carbon dioxide or water. It results in purification of water and surfaces from toxic organic substances without formation of life-threatening compounds. One of the most popular photocatalysts is titanium dioxide, which unfortunately does not absorb visible light, which considerably limits its applicability. The semiconductor sensitive for irradiated sunlight is bismuth vanadate (BiVO_4). Attaching the organic molecules on the surface of the BiVO_4 its photocatalytic properties can be improved.

The project will focus on the synthesis, structural, electronic and optical studies of the BiVO_4 . In order to find efficient photocatalytic material. Mentioned studies will be performed also for dye sensibilised BiVO_4 as well as for metal ions doped BiVO_4 . The charge transfer phenomena occurring in the BiVO_4 /organic dye systems will be examined by theoretical and experimental investigation and the model of the mentioned phenomena will be discussed. In future, it will give possibility to design hybrid materials appropriate for photoactive phenomena and sun irradiating applications. It will give measurable influence to natural environment through construction of photocatalytic devices.