Photoactive complex nanostructures obtained via anodic oxidation.

Research related to the phenomenon of photocatalytic processes is in the area of interest of many specialists. When we combine them with the rapidly growing market of nanomaterials (mineral nanomaterials, metal nanooxides and nanotubes) we will get a promising connection that will interest not only scientists but also potential investors mainly due to a wide range of applications - from the hospital environment to the car industry.

Due to the fact that vast number of harmful microorganisms appear in the environment that pose a significant threat to human health and life, research has begun to create efficient nanomaterials with both antibacterial and photocatalytic properties and no contraindications to use in everyday life.

One of such solutions is a combination of titanium dioxide (TiO_2) characterized by high chemical stability, relatively low price while being a harmless material for the environment, with other metals having anti-bacterial properties such as copper, silver, gold or platinum.

The main objective of the project is **(a) to obtain photocatalytically active nanostructures with bactericidal properties through the anodic oxidation process, where the substrate will be three-component metal alloys (Ti-Cu-Pt, Ti-Cu-Au, Ti-Ag-Pt, Ti-Ag-Au), (b) investigating the influence of voltage, process time and electrolyte composition used in the preparation of nanostructures on their morphology,** as well as **(c) investigating the photoactivity of the obtained nanostructures in the model reaction of microorganisms inactivation from the aqueous phase.** In addition, a comprehensive characterization of the photocatalysts obtained will be carried out in terms of surface morphology, crystalline structure, crystallite size and chemical character of the additives.