Nanoplasmonics and surface enhanced spectroscopy

Perspectives applications of nanodispersed chalcogenides of transition metals in photocatalysis

I.M. Ivanenko, T.A. Dontsova, Yu.M. Fedenko

National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute".4 Build, 37 Prospect Peremogy, Kyiv 03056, Ukraine
E-mail: irinaivanenko@hotmail.com

In conditions of modern world, the scientific-technical progress causes the necessity in environmental protection, more rational appliance of mineral and energy resources. Modern chemical industry has need, first of all, for modern, economically justified and technologically simple methods of industrial water purification and wasted gases. That's why, one of the most perspective ways of solving problems, numbered above, is appliance of photo catalysis, based on high effective photo catalysts.

Photocatalytic processes in the last decade cause increasing concern. Such processes find wide industrial application, for example: photocatalytic decomposition of harmful organic compounds, both in solutions and in the gas phase; transformation of sun energy into chemical and electric; producing sensors and nanophotonic devices; organic synthesis processes.

Photocatalytic reactions are able to occur at room or lower temperature with visible light. It allows using sun energy for carrying out useful processes. Most processes occur by using heterogeneous photo catalysts, which are semiconductors. Titan (IV) oxide is frequently used due to its high catalytic activity, high chemical stability, low cost and absence of toxicity.

Photocatalysis at present time is the branch of science, which can help to solve many ecology and energy problems within the growing of scientific and technical progress. It's necessary to actively explore photophysical properties of such materials and compositions, in the base of which effective and catalytic active photocatalysts can be get.

In recent years, attention is directed to hrafen-like structures. This is due to the fact that in 2004 researchers from Manchester University [1] discovered the simple method of producing hrafen and could to reveal its new properties. Chalcogenides of transition metals fall under the category of hrafen-like structure, the quantity of its investigations continuously increase in time.

1. *Novoselov K.S., Geim A.K., Morozov S.V., Jiang D., Zhang Y., Dubonos S.V., Grigorieva I.V., Firsov A.A.* Electric Field Effect in Atomically Thin Carbon Films // *Science.*-2004.- **306**, N 5696.-P. 666-669.