DESCRIPTION FOR THE GENERAL PUBLIC

Presented project is aimed to synthesis of nanocrystalline composites TiO_2-SnO_2 with innovative, two-step sol-gel method (patented by the petitioner) and to determine the impact of physicochemical properties of produced composites to sensors response NH_3, H_2 carried out on their basis.

The project applies to both widening the knowledge about production of nanocomposites TiO_2-SnO_2 with different chemical and phase composition, and different structure, as well as to study relations between physicochemical properties of produced nanocomposites, and the selectivity and sensitivity of gas sensors carried out on their basis.

In contrast to simple metal oxides such as TiO_2 or SnO_2 the synthesis of their nanocomposites is less know. In the scientific literature, methods to obtain nanocomposites TiO_2-SnO_2 are well-known, however they don't enable to regulate the particles size TiO_2, and thus to receive nanocomposites containing TiO_2 of different particle size and different phase composition (anatase/rutile). As a part of basic research carried out in this project, there will be widened knowledge about synthesis of composite nanopowders TiO_2-SnO_2, hence not only about known and controlled chemical and phase composition, but also about distinct diversified particles sizes TiO_2 and SnO_2. Detailed study concerning technology of nanocomposites will allow more precisely than so far to control applied methods, mutual spatial distribution of composite components, i.e. which effect will be coating of TiO_2 grains with SnO_2 grains, rather than only accidental mixing of two powders types, as well as to obtain powders with high specific surface development and low agglomeration of particles. In the project an impact of the physicochemical properties of produced nanocomposites TiO_2-SnO_2 to response of gas sensors carried out on their basis will be studied. Carried out studies will provide information both about the synthesis of nanocomposites TiO_2-SnO_2, and will enable to design composite materials with the most favorable parameters for sensor applications and will create the basis for resistive technology, gas detectors, characterized by a better sensitivity and selectivity. Chemical gas sensors with optimized chemical, phase composition and structure may contribute to a better detection of dangerous substances, toxic or flammable, which are important in the industry.