

Nanometallic catalysts for selective oxidation of alcohols - abstract

The growing global demand for biodiesel has increased the supply of glycerol as a by-product in the production of biofuels. Due to the low cost and general accessibility of processing glycerol is an attractive and versatile raw material. It is non-toxic, edible and biodegradable. In addition oxygenates, dehydration, etherification, esterification products can be used as building blocks or fuel additives. However a variety of glycerol products can be formed during its processing. The solution of the problem could be a highly efficient and selective catalysts.

Substantial attention of this research is focused on the use of gold and other noble metals nanocatalysts deposited on carriers mainly including materials such as silica, carbon, metals or metal oxides. We used the innovative transfer method for the production of new Au catalysts used in glycerol processing. Moreover the research study included comprehensive research of produced materials, i.a., in terms of the structure, activity, selectivity and determining the field of applicability. The surface studies of engineered nanomaterials were based on employing techniques of electron microscopy (TEM, SEM, HRTEM) and X-ray diffraction (XPS, XRD, EDXRF). The analyse of post reaction mixtures were carried out on the basis of spectroscopic (^1H , ^{13}C NMR, COSY, HMQC), and other analytical methods (ASA MALDI-TOF).

Within its scope the project includes the issues that are on the line of organic synthesis and the preparation of new nanocatalysts which are useful potential catalysts for selective oxidation or dehydration of glycerol and other alcohols. The investigations carried out under the project will allow to better understand and improve new technologies in the field of process control selective processing of surplus of glycerol in the liquid and gas phase involving nanocatalysts noble metals (Au, Ag, Pd). The scope of the research project was also focused on new trends by concentrating research in the areas of heterogeneous catalysis, environmental protection, utilization of surplus of glycerol, catalytic obtaining of organic compounds from glycerol with an emphasis on waste-free and environmentally friendly nature of the application of these solutions.