# $Au/TiO_2$ catalysts in solvent free peroxidative oxidation of 1-phenylethanol under mild conditions

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Alcohol oxidation is one of the most important transformations in industrial organic chemistry and a challenging process in terms of green chemistry. Traditional methods involve the use of toxic, expensive stoichiometric metal oxidants and harmful organic solvents, and they often require vigorous reaction conditions [1]. Catalysis research is working towards a solution through the development of effective heterogeneous catalysts for environmental applications.

In this work it was investigated $Au/TiO_2$ either unmodified or modified by lanthanum oxide catalytic systems for 1-phenylethanol oxidation under mild conditions similar to the requirements of the "green chemistry" (T = 80 °C, TBHP as green oxidant, without the use of alkali and solvent). Catalysts were prepared via deposition-precipitation method and characterized by adsorption of $N_2$ at -196ºC, XRD, EDX, XPS, UV-Vis spectroscopy, TEM and STEM-HAADF.

The features of the formation and stabilization of active sites of gold in $Au/M_xO_y/TiO_2$ catalysts were investigated. The influence of the nature of the support, gold content and pre-treatment atmosphere on catalytic properties of gold systems is determined primarily by the action of these factors on the electronic state of the deposited metal. It should be stressed that as in the oxidation of 1-octanol [2], the sample modified with lanthanum oxide demonstrated the best catalytic performance. 98% yield of acetophenone was achieved already in 1 h when 4% $Au/La_2O_3/TiO_2$ pre-treated in $H_2$ was used.

**References**

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