

Homogeneous, Heterogeneous and Nano-Sized Catalytic Systems: Simple Solution of Complex Chemical Problems

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Nowadays chemistry is faced with several important questions concerning development of new and efficient procedures for synthesizing and manufacturing of complex chemical molecules. The most important criteria for development of new chemical procedures concern environmentally friendly and economically justified synthetic methods. Most reliable approach for the solution of these problems is based on the application of transition-metal-catalyzed reactions.

Catalytic reactions ensure high regio- and stereoselectivity of the chemical transformations as well as better yields and mild reaction conditions. The most commonly utilized tools for tuning catalyst activity are i) metal type, ii) ligand, iii) temperature and iv) solvent effects.

In our research we have developed several catalytic systems under homogeneous, heterogeneous and nano-sized conditions for selective formation of carbon-heteroatom and carbon-carbon bonds [1-3]. Size effect of the catalyst particles was shown to be a new flexible tool not only for tuning catalytic activity and selectivity, but also for changing the directions of chemical transformations.

Combining well-known properties of catalytic systems with recently developed size-dependent approach opens a new opportunity for creating clean and simple chemical procedures. Some representative examples based on our recent studies will be presented and discussed in view of up-to-date tendencies in this field.

References:

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