conferenceseries.com SciTechnol

Vera I Isaeva, J Nanomater Mol Nanotechnol 2017, 6:4 (Suppl)
DOI: 10.4172/2324-8777-C1-008

# 16th World Nano Conference

**June 05-06, 2017 Milan, Italy**

## *Vera I Isaeva*

*National University of Science and Technology MISiS, Russia*

## Nanostructured supports design: A prospective way to modern catalysts constructing

**Statement of the Problem:** Intense research efforts are focused on the development of nanostructured catalysts thanks to their advanced properties regarding activity and selectivity. Numerous works dealing with nanostructured catalysts relate to metal nanoparticles deposited on different supports. Some reports consider nano-porous matrices with well-controlled surfaces. The modulation of textural and compositional properties of nanostructured carriers allows enhancing the performance of heterogeneous catalysts on their basis in a specific process. Besides creation of nano-porosity using appropriate templates in synthesis course like in zeolites and meso-porous silicas other promising way for the design of nanostructured heterogeneous catalysts is the utilization of carriers composed by nanoparticles. In this context, using a novel type of nano-porous matrices - metal-organic frameworks (MOFs) is a promising approach to rational design of supported catalysts. MOFs are hybrid coordination polymers built from small metal clusters and organic linkers and feature 3D-frameworks comprising nano-dimensional channels, pores or cavities. The purpose of this study is to explore two principal approaches to design of nanostructured MOFs supports for heterogeneous catalysts. Our work was focused on clarifying the possibility to control the activity and selectivity of the heterogeneous catalyst changing the MOF support dispersion between micro- and nanoscale.

**Methodology:** MOFs materials in form of nanocrystals and micro-granules were utilized as host matrices for metal nanoparticles deposition. In order to administer the particles size and morphology, we have synthesized MOF samples by MW-assisted synthesis at an atmospheric pressure according to the original approach and by convenient solvothermal procedure. The structural characteristics and catalytic performance of M@MOF nano-hybrids based on MOF supports with nano- and micro particles are compared. The catalytic performance of thus obtained M@MOF catalysts was demonstrated in practically important reactions, e.g. hydroformylation and Fisher-Tropsh synthesis.

**Findings:** This work results demonstrate the strong impact of support crystal size and morphology on the catalytic performance of M@MOFs nano-hybrids.

**Conclusion:** The activity and selectivity of heterogeneous catalysts can be controlled using MOF materials with different dispersion and morphology as host matrices for MNPs deposition.

## Biography

Vera I Isaeva is a leading Researcher at National University of Science and Technology MISiS, Moscow, Russia. Her activity is focused on “The development of nanostructured materials including MOFs and composites on their basis, from synthesis to application, especially for energy saving processes. She has co-authored over 100 publications in peer-reviewed journals and two book chapters.

sharf@ioc.ac.ru