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ICG 2019

4th Edition of International Conference on

Catalysis and Green Chemistry

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Collaboration & Publishing partner

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Theme: *Catalyzing Inventive Technologies and Estimating Methodologies to Modernize the approaches in Catalysis and Green Chemistry*

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BOOK OF ABSTRACTS

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The use of aerosol nanocatalysis technology is one of the new directions of industrial development

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Currently, the success of the chemical industry is associated with the use of heterogeneous catalysis on carriers. It is also called traditional catalysis. The majority of modern scientific works in the field of catalysis include:

- The search for catalytically active substances and mixtures,
- The improvement of their structure and the choice of carrier material,
- The technology of preparation and methods of fixing the active substances on the surface of the carrier.

The most important problems considered the problems of activity, poisoning and regeneration of catalysts. Despite the technology with a catalyst on a carrier has a development in chemistry and covers a wide range of raw materials and processes. The difficulties of this catalysis are associated with both a reduction in the possibility of full use of the technology, and a rapid deactivation of the catalyst. The technology of aerosol nanocatalysis (AnC), developed by us, reduced the effect of these difficulties.

This technology is based on the use of a catalyst without a carrier in the aerosol. It is crushed to nanoscale in a reactor in situ. The constant mechanical and chemical activation of the surface of the catalyst nanoparticles in the reactor allows:

- Maintains high catalyst activity;
- Increases the reaction rate (10^4–10^6 times based on the weight of the catalyst when compared with traditional catalysis);
- Reduces the catalyst concentration (up to 0.3–5 g/m^3 of the reaction volume);
- Reduces the reactor volume (2–10 times);
- Allows you to even reach the catalyst surface with reagents;
- Uses reagents in any aggregate state.

The first publication on AnC technology appeared in the journal The Theoretical Foundations of Chemical Technology in Russia in 1996. The technology AnC began with the technology with a fluidized bed reactor. During the development of technology, about 50 individual substances and about 30 real industrial wastes were investigated. The obtained results of laboratory studies were confirmed in four pilot plants in Russia, Ukraine and Sweden. Unfortunately, the technology of aerosol nanocatalysis has not received further industrial development.

The technology AnC under laboratory conditions develops in a vibro-fluidized bed reactor. It is convenient for studying the kinetics of chemical reactions in the laboratory. Also, there is a new development in the reactor with a rotating bed. It is effective in chemical interaction and easy to use in industry. The technology of aerosol nanocatalysis has proven itself well in both ecological processes and some syntheses of chemical compounds.

The table presents some of the processes studied in the reactor aerosol nanocatalysis.

Table. Some processes investigated by aerosol nanocatalysis technology

process	temperature, K	catalyst		reaction rate	
		g/m³	composition	kg/m³*hour	kg/g_{cat}*hour
cracking process:					
n-pentane	873	5,0	V_2O_5	849,6	169200
vacuum gas-oil	873	1,0	CaA	1265,2	421745
	723	3,0	Si/Zr	1177,6	392526
	873	2,0	Nexus-345	434,1	217000
oxidation processes:					
1,2-dichloroethane	853	3619	CuO	135,97	117,36
	903	2,4	CuO	3033,6	1264,2
natural gas	973	4,8	Fe_2O_3	92,16	70056
tarsil water	873	0,5	Fe_2O_3	168,4	168426
waste lubricant drain	873	0,1	Fe_2O_3	14,3	143200

Audience Take Away:

- The technology of aerosol nanocatalysis is one of the new promising areas for the development of the chemical and petroleum refining industry.
- The technology of aerosol nanocatalysis will be interesting for enterprises and companies related to environmental issues.
- The technology of aerosol nanocatalysis will allow scientific organizations to take a fresh look at the kinetics of chemical and physical processes simultaneously.
- The technology of aerosol nanocatalysis is universal and mobile for various chemical transformations.

Biography

Dr. Glikina I. graduated as MS in 1998 in Severodonetsk Technology Institute (now Volodymyr Dahl East-Ukrainian National University). While studying at the institute Iryna was engaged in research activities. Her work is related to scientific research in the field of catalytic processes, research and development of promising global chemical industry technologies. She received her PhD degree in 2005 at the at the National University Lviv Polytechnic and degree of Doctor of techninal science in 2015 at the same university. She is the author of over 150 research publications on chemical technology of organic substances and fuel.