NICKOLAY OSTROVSKII

Corresponding member since 2018.

Data of Birth: March 2, 1949, Ternopol, USSR

Education: 1971 – B. Sc., Polytechnic Institute in Odessa, USSR

Faculty of Chemical Technology,

Specialty – Chemical Engineering and Chemical Cybernetics

Dissertation:

1978 – Doctoral dissertation (Ph.D.) – Polytechnic Institute in Tomsk, USSR

1998 – Large Doctoral dissertation (Doc. of Sci.) – Institute of Catalysis Siberian Branch of Russian Academy of Science (IC SB RAS), Novosibirsk

Academic Status:

1992 – Senior staff scientist – IC SB RAS (Russia)

1999 – Professor – Omsk State University (Russia)

2004 – Research fellow – Ministry of Science (Serbia)

Employment history:

1971 – 1978 – IC SB RAS, Novosibirsk – Junior Researcher

1978 – 2002 – IC SB RAS, Omsk – Senior Researcher; Chef of laboratory

2002 – 2016 – Hipol a.d., Odžaci, Serbia – Research & Development Manager

2016 – 2017 – Euro Gas, Subotica, Serbia – Technology Consultant (as of 2017 retired)

Membership in committees and societies:

- Scientific Council in IC SB RAS, Novosibirsk (1995–2000)
- Dissertation Council (Ph.D.) in IC SB RAS (1995–2000)
- Academic Council in Chemical Faculty of Omsk State University (1998–2001)
- Society of Physical Chemists of Serbia (since 2002)
- American Chemical Society (since 2006)
- Union of Chemical Engineers of Serbia (since 2012)
- Chemical Technology Council in Russian Academy of Science (1997–2001)
- Catalysis Council in Russian Academy of Science (since 2011)

Language: Russian, Serbian, English, Ukrainian

Research topics:

- Kinetics and dynamics of catalytic reactions and chemical processes
- Heat and mass transfer processes in chemical technology
- Mathematical modeling and optimization of chemical reactors

Scientific results:

- The main results relate to the area of catalyst deactivation. They are presented in a monograph [1] and in more than 15 publications. A new class of deactivation kinetics equations was proposed, based on the principle of quasi-stationarity and stage mechanisms.
  General equations for linear and nonlinear mechanisms of deactivation were obtained.
  Mechanism and equations of deactivation by means of multilayer coking were formulated.
  A method and models for interpreting deactivation experiments were developed.
  The models were used to optimize industrial catalytic processes (4 patents).
- Dynamics of reactions on the catalyst surface caused by ion diffusion in the catalyst crystals. The range of the ion diffusion coefficient was found $10^{-17} \div 10^{-15}$ cm^2/s, at which the diffusion affects the dynamics of the reaction on oxide catalysts [4].
- Effect of capillary condensation of reagents in the catalyst pores on the kinetics and dynamics of catalytic reactions. The areas of influence of capillary condensation on the diffusion in porous catalyst particles, and even on the kinetics of reactions, the rate of which is different in the pores with the gas phase and with the condensed phase, were investigated [5].
- Number of publications – 134; In international journals – 32; Keynote lections – 15.

Evaluation of scientific results:

The works were cited 320 times (by ResearchGate service, without Russian journals).

h-index 10 (without self-citation).

The reviewer of 4 journals, including Chem. Eng. J. and Kinetics & Catalysis.

Teaching activities:

1980 – 2001 – Omsk State University (Russia) – Docent; Professor (since 1998)

1998 – 2001 – Omsk Technical University (Russia) – Professor.

Subject: Basic chemical technologies and reactors; Heterogeneous catalysis.

Mentor of 3 doctoral dissertations, and about 20 theses.

Organizational work:

- Founder and Head of the Laboratory of kinetics and modeling in IC SB RAS, Omsk.
- Participation in the organization of several international and domestic conferences.
- National coordinator of cooperation of RAN and SANU in catalysis (2000–2003)
- Participation in international collaborations with researchers from Russia, Serbia, Bulgaria, Italy, the United States, Belgium, and Germany.
- Editorial boards: Chemical Industry (Serbia); Catalysis in Industry (Russia).

Contributions to non-linear sciences:

- Non-linearity of the model of physico-chemical processes caused by nonlinear dependence of the reaction rate on temperature (exponential) and on concentration of reagents (product).
- Most models are systems of multiphase partial differential equations types of Fourier, Navier-Stokes or Fokker–Planck–Kolmogorov (depending on the reactor type) and with nonlinear functions for the reaction rates and deactivation (poisoning) of catalysts.
- By solving such systems, several industrial processes were optimized, and non-stationary modes of their operation were found, more effective than stationary one (4 patents).
- A model of the nonlinear kinetics of liquid diffusion in porous adsorbents was developed.
- The hysteresis of the reaction rate on catalysts in the regions of capillary condensation of reagents was predicted by simulation and confirmed in experiments.
- 2018 – Corresponding Member of the Serbian Academy of Nonlinear Sciences.

List of 5 selected works:

1. *Островский Н.М.* **Кинетика дезактивации катализаторов**. (Монография). Москва, Наука, 2001, 334 с.
2. *Ostrovskii N.M.* New Models of Catalyst Deactivation by Coke. **Kinetics & Catalysis**, 2001, v. 42, N 3, p. 317-333.
3. *Ostrovskii N.M.* General equation for linear mechanisms of catalyst deactivation. **Chem. Eng. Journ.**, 2006, v. 120, No. 1-2, p. 73-82.
4. *Ostrovskii N.M., Reshetnikov S.I.* The influence of oxygen mobility in solid catalyst on transient regimes of catalytic reaction. **Chem. Eng. Journ.**, 2005, v. 107, No. 1-3, p. 141-146.
5. *Ostrovskii N.M., Wood J.* Reaction and Capillary Condensation in Dispersed Porous Particles. In "**Finely Dispersed Particles: Micro-, Nano-, and Atto-Engineering**", Taylor & Francis Group, London, New-York, 2006, Chapter 23, p. 601-640.