

# Evgeny I. Vovk, Ph. D.

**Researcher** (current position)  
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## SCIENTIFIC BACKGROUND:

- 2001 - Present**      **Boreskov Institute of Catalysis, Russian Academy of Science.** Staff researcher  
Surface Science Laboratory  
<http://catalysis.ru/>
- 2009 – 2015**      **Bilkent Univeristy, Ankara, Turkey.** Researcher  
Laboratory for Surface Science and Catalysis  
<http://www.fen.bilkent.edu.tr/~ozensoy/>
- 2001 - 2002**      **Novosibirsk State University, Russia.** Teaching (thermodynamics, chemical kinetics)  
Department of natural sciences  
<http://nsu.ru/>
- 1997 - 2001**      **Boreskov Institute of Catalysis, Russia.** Ph.D. in Chemistry  
Thesis: *Investigation of NO, CO and hydrogen adsorption and its interactions on the non-homogeneous Pt(100) surfaces.*  
Advisors: **M.Yu. Smirnov, D.Yu. Zemlynov**  
<http://catalysis.ru/>
- 1991 – 1997**      **Novosibirsk State University, Russia.** Master of Science, with excellent grade  
Department of natural sciences  
<http://nsu.ru/>

## EXPERIENCE:

- Synthesis, characterization and investigation of wide rang heterogeneous real and model catalysts. Utilization of physical methods: XPS (mainly), FTIR, IRAS, TPD(TPRS), Raman, XRD, LEED, HREELS, SEM (with EDS).
- Investigator and co-PI in various research projects (including research projects with industry (Ford, GM))
- Local Research group leading, working with students.
- Teaching experience (Thermodynamics for chemists in Novosibirsk state University).

**RESEARCH INTERESTS:**    *The nature of active species on solid surfaces. Mechanisms of heterogeneous catalytic reactions.*

## ACADEMIC PUBLICATIONS:

(full texts are available online: [https://www.researchgate.net/profile/Evgeny\\_Vovk](https://www.researchgate.net/profile/Evgeny_Vovk))

1. "Kinetic isotope effect in the reaction of  $\text{NO}_{\text{ads}}$  and  $\text{CO}_{\text{ads}}$  on the Pt(100) surface"  
D.Yu. Zemlyanov, M.Yu. Smirnov, V.V. Gorodetskii and E.I. Vovk  
**Catalysis Letters** 46 (1997) 201-205.
2. "Formation of mixed ( $\text{NO}_{\text{ads}}$ + $\text{CO}_{\text{ads}}$ )/(1×1) islands on the Pt(100)-(hex) surface"  
M.Yu. Smirnov, D.Yu. Zemlyanov, V.V. Gorodetskii and E.I. Vovk  
**Surface Science** 414 (1998) 409-422.
3. "NO and CO adsorption on the non-homogeneous Pt(100) Surfaces"  
D.Y. Zemlyanov, M.Y. Smirnov, E.I. Vovk  
**Langmuir** 15 (1999) 135-140.
4. "Effect of NO on  $\text{D}_2$  adsorption on the Pt(100)-(hex) surface"  
E.I. Vovk, M.Y. Smirnov, D.Y. Zemlyanov,  
**Journal of Molecular Catalysis A** 158 (2000) 395-398.
5. "NO and deuterium co-adsorption on the reconstructed Pt(100)-hex surface: a TPR Study"  
E.I. Vovk, M.Y. Smirnov, D.Y. Zemlyanov  
**Surface Science** 453 (2000) 103-111.
6. "Control system for thermodesorption experiments"  
V.V. Kaichev, A.M. Sorokin, A.I. Timoshin, E.I. Vovk  
**Instruments and Experimental Techniques** 1 (2002) 58-62.
7. "Methodic aspects of STM investigations of the samples with non-uniform conductivity – model catalysts"  
A.V. Nartova, R.I. Kvon, E.I. Vovk, V.I. Bukhtiyarov  
**Bulletin of the Russian Academy of Sciences. Physics** 69, 4 (2005) 524-528.
8. "Mechanism of the Reaction  $\text{NO} + \text{H}_2$  on the Pt(100)-hex Surface under Conditions of the Spatially Nonuniform Distribution of Reacting Species"  
M.Yu. Smirnov, D.Yu. Zemlyanov and E.I. Vovk  
**Kinetics and Catalysis** 48, 6 (2007) 853–863.
9. "Use of the differential charging effect in XPS to determine the nature of surface compounds resulting from the interaction of a Pt/BaCO<sub>3</sub>/Al<sub>2</sub>O<sub>3</sub> model catalyst with NO<sub>x</sub>"  
M.Yu. Smirnov, A.V. Kalinkin, A.A. Dubkov, E.I. Vovk, A.M. Sorokin, A.I. Nizovskii, B. Carberry and V.I. Bukhtiyarov.  
**Kinetics and Catalysis** 49, 6 (2008) 831-839.
10. "X-ray photoelectron spectroscopic studies of the charged state of 3d metal ions in  $\text{CuCr}_{1-x}\text{V}_x\text{S}_2$  ( $x = 0-0.4$ )"  
L.N. Mazalov, V.V. Sokolov, N.A. Kryuchkova, E.I. Vovk, I.Yu. Filatova and G.M. Abramova.  
**Journal of Structural Chemistry** 50, 3 (2009) 439-445.
11. "The effect of 3d-cation modification on the properties of cordierite-like catalysts"  
E.F. Sutormina, L.A. Isupova, N.A. Kulikovskaya, A.V. Kuznetsova, E.I. Vovk  
**Book chapter** "Scientific Bases for the Preparation of Heterogeneous Catalysts", Elsevier (2010) 343-346.
12. "Use of the differential charging effect in XPS to determine the nature of surface compounds resulting from the interaction of a Pt/(BaCO<sub>3</sub> + CeO<sub>2</sub>) model catalyst with SO<sub>x</sub>"  
M.Yu. Smirnov, A.V. Kalinkin, A.A. Dubkov, E.I. Vovk, A.M. Sorokin, A.I. Nizovskii, B. Carberry and V.I. Bukhtiyarov  
**Kinetics and Catalysis**, 52, 4 (2011) 595-604.

13. "Direct Evidence for the Instability and Deactivation of Mixed-Oxide Systems: Influence of Surface Segregation and Sub-surface Diffusion"  
E. Emmez, E.I. Vovk, V.I. Bukhtiyarov, E. Ozensoy,  
**J. Phys. Chem. C** 115 (2011) 22438-22443.
14. "Role of the Exposed Pt Active Sites and BaO<sub>2</sub> Formation in NO<sub>x</sub> Storage Reduction Systems: A Model Catalyst Study on BaO<sub>x</sub>/Pt(111)"  
E.I. Vovk, E. Emmez, M. Erbudak, V. Bukhtiyarov, E. Ozensoy,  
**J. Phys. Chem. C** 115 (2011) 24256–24266.
15. "An XPS Study of the Oxidation of Noble Metal Particles Evaporated onto the Surface of an Oxide Support in Their Reaction with NO<sub>x</sub>"  
M.Yu. Smirnov, E.I. Vovk, A.V. Kalinkin, A.V. Pashis, and V.I. Bukhtiyarov,  
**Kinetics and Catalysis** 53, 1 (2012) 117–124.
16. "SO<sub>x</sub> uptake and release properties of TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> and BaO/TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> mixed oxide systems as NO<sub>x</sub> storage materials"  
G.S. Şentürk, E.I. Vovk, V.I. Zaikovskii, Z. Say, A.M. Soylu, V.I. Bukhtiyarov, E. Ozensoy,  
**Catal. Today** 184 (2012) 54.
17. "Influence of ceria on the NO<sub>x</sub> reduction performance of NO<sub>x</sub> storage reduction catalysts"  
Z. Say, E.I. Vovk, V.I. Bukhtiyarov, E. Ozensoy,  
**Applied Catalysis B: Environmental** 142–143 (2013) 89–100.
18. "Enhanced Sulfur Tolerance of Ceria-Promoted NO<sub>x</sub> Storage Reduction (NSR) Catalysts: Sulfur Uptake, Thermal Regeneration and Reduction with H<sub>2</sub>(g)"  
Z. Say, E.I. Vovk, V.I. Bukhtiyarov, E. Ozensoy,  
**Topics in Catalysis** 56 (2013) 950–957.
19. "Interactive Surface Chemistry of CO<sub>2</sub> and NO<sub>2</sub> on Metal Oxide Surfaces: Competition for Catalytic Adsorption Sites and Reactivity"  
E.I. Vovk, A. Turksay, V.I. Bukhtiyarov, E. Ozensoy  
**J. Phys. Chem. C** 117 (2013) 7713–7720.
20. "In-Situ Vibrational Spectroscopic Studies on Model Catalyst Surfaces at Elevated Pressures"  
E.I. Vovk, E. Ozensoy  
**Topics in Catalysis** 56 (2013) 1569–1592.
21. "Chemical deactivation by phosphorous under lean hydrothermal conditions over Cu/BEA NH<sub>3</sub>-SCR catalysts"  
S.M. Andonova, E.I. Vovk, J. Sjöblom, E. Ozensoy, L. Olsson  
**Applied Catalysis B: Environmental** 147 (2014) 251–263.
22. "XPS study of model Ba/TiO<sub>2</sub> and Ba/ZrO<sub>2</sub> NSR catalysts interaction with NO<sub>2</sub>"  
M.Yu. Smirnov, A.V. Kalinkin, D.A. Nazimov, V.I. Bukhtiyarov, E.I. Vovk, E. Ozensoy  
**Journal of Structural Chemistry** 55 (2014) 757–763.
23. "NaCl-Promoted CuO-RuO<sub>2</sub>/SiO<sub>2</sub> Catalysts for Propylene Epoxidation with O<sub>2</sub> at Atmospheric Pressures: A Combinatorial Micro-reactor Study"  
S. Kalyoncu, D. Duzenli, I. Onal, A. Seubsai, D. Noon, S. Senkan, Z. Say, E.I. Vovk, E. Ozensoy  
**Catalysis Letters** 145 (2015) 596–605.
24. "Palladium doped Perovskite-Based NO Oxidation Catalysts: The Role of Pd and B-sites for NO<sub>x</sub> Adsorption Behavior via in-situ Spectroscopy"  
Z. Say, M. Dogac, E.I. Vovk, E. Kalay, C.H. Kim, W. Li, E. Kalay, E. Ozensoy  
**Applied Catalysis B: Environmental** 154-155 (2014) 51–61.

25.        *“Comparison of thermal stability of gold nanoparticles deposited on Al<sub>2</sub>O<sub>3</sub> and Fe<sub>2</sub>O<sub>3</sub> in the CO + O<sub>2</sub> reaction medium”*  
M. Yu. Smirnov, E.I. Vovk, A.V. Kalinkin, E.Y. Gerasimov, V.I. Bukhtiyarov  
**Russian Chemical Bulletin** 63, 12 (2014) 2733—2736
  
  26.        *“Influence of the sol–gel preparation method on the photocatalytic NO oxidation performance of TiO<sub>2</sub>/Al<sub>2</sub>O<sub>3</sub> binary oxides”*  
M. Polat, A.M. Soyulu, D.A. Erdogan, H. Erguven, E.I. Vovk, E. Ozensoy  
**Catalysis Today** 241 (2015) 25–32.
  
  27.        *“Influence of Sulfur Poisoning on Pd/LaMnO<sub>3</sub> and Pd/LaCoO<sub>3</sub> DeNO<sub>x</sub> Catalysts ”*  
M. Dogac, Z. Say, E.I. Vovk, C.H. Kim, T. Wei, E. Ozensoy  
(submitted)
  
  28.        *“Acetaldehyde Partial Oxidation on the Au(111) Model Catalyst Surface: C-C bond Activation and Formation of Methyl Acetate as an Oxidative Coupling Product”*  
M. Karatok, E.I. Vovk, S.A.A. Shah, A. Turksoy, E. Ozensoy  
**Surface Science** 641 (2015) 289–293.
  
  29.        *”Size Effect in the Oxidation–Reduction Processes of Platinum Particles Supported onto Silicon Dioxide”*  
M. Yu. Smirnov, A. V. Kalinkin, E. I. Vovk, and V. I. Bukhtiyarov  
**Kinetics and Catalysis** 56, 6 (2015)801–809.
  
  30.        *“Active and Inactive Oxygen in Methanol Oxidation on the Au(111) Surface”*  
E.I. Vovk, M. Karatok, S.A.A. Shah, A. Turksoy, V.I. Bukhtiyarov, E. Ozensoy  
(in preparation)
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## CONFERENCE PRESENTATIONS (only main presentations):

1. Catalysis on the Eve of the XXI Century. Science and Engineering. 2nd G.K. Boreskov Memorial Conference. (1997) July 7-11, Novosibirsk, Russia  
**Poster Presentation:** "Surface explosion, islands, phase transitions, active centers at CO+NO/Pt(100) reaction studied by HREELS and TDS"
2. Physical Methods for Catalytic Research at the Molecular Level. International Memorial K.I. Zamaraev Conference. (1999) June 28 –July 2, Novosibirsk, Russia  
**Poster Presentation:** "Influence of NO on deuterium adsorption on the Pt(100)-(hex) surface"
3. 222<sup>nd</sup> ACS National Meeting, Division of Colloid & Surface Chemistry, (2001) August 26-30 Chicago  
**Poster Presentation:** "Apparent activation energy difference in NO+CO and NO+H<sub>2</sub> reactions on the Pt(100) surface"
4. The VI Conference on Mechanisms of Catalytic Reactions. (2002) October 1-5, Moscow, Russia  
**Poster Presentation:** "Mechanism of "surface explosion" in the reactions NO+CO and NO+H<sub>2</sub> on the Pt(100) surface"
5. International School-conference on Catalysis for Young Scientists, CATALYST DESIGN, (2005) July 25-29, Novosibirsk-Altai, Russia  
**Oral Presentation:** "Thermal stability of Gold particles in Au/Al<sub>2</sub>O<sub>3</sub> and Au/Fe<sub>2</sub>O<sub>3</sub> model catalysts"
6. The VII Conference on Mechanisms of Catalytic Reactions, (2006) July 3-8, St. Petersburg, Russia  
**Oral Presentation:** "Thermal stability of Gold nanoparticles in Au/Al<sub>2</sub>O<sub>3</sub> and Au/Fe<sub>2</sub>O<sub>3</sub> model catalysts for CO oxidation"
7. 26th European Conference on Surface Science, (2009) August 30 - September 4, Parma, Italy  
**Oral Presentation:** "Oxidation of Pt, Rh, and Pd nanoparticles with NO<sub>x</sub> mixture: the nature of surface species"
8. The IX Conference on Mechanisms of Catalytic Reactions. (2012) October 22-25, St. Petersburg, Russia  
**Oral Presentation:** "Ce-O-Pt active sites in ceria promoted NO<sub>x</sub> Storage Reduction catalysts"
9. 11<sup>th</sup> European Congress on Catalysis – EuropaCat-XI. (2013) September 1-6, Lyon, France  
**Poster Presentation:** "Role of CO<sub>2</sub> in NO<sub>x</sub> Storage on Model BaO<sub>x</sub>/Pt(111) catalysts"
10. 30<sup>th</sup> European Conference on Surface Science (ECOSS-30). (2014) August 31 - September 5, Antalya, Turkey  
**Oral Presentation:** "Active and Inactive Oxygen on the Au(111) Model Catalyst Surface in Methanol Partial Oxidation"
11. 12<sup>th</sup> European Congress on Catalysis – EuropaCat-XII, (2015) August 30 – September 4, Kazan, Russia  
**Oral Presentation:** "Reactivity of Oxygen in Methanol Partial Oxidation over Au(111) Model Catalyst Surface"