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- Surface science, electron-hole transport and sensing properties of individual nanostructures (nanowires /nanotubules, clusters, nanoparticles), their assemblies and nano-structured surfaces (semiconductor oxides).
- Fabrication /functionalization of nano-structures and nanostructured surfaces with tunable properties; manufacturing of corresponding nanodevices for sensing, energy conversion, catalysis and other applications.
- Bridging the “structural and pressure gaps” between studies of model surfaces / nanostructures and corresponding devices operating in the "real world" environment.
- Development of (spectro)-microscopic techniques for *in-situ* / *in vivo* characterisation of functioning nanostructures and nanodevices.

Publications, presentations and related activity

- 1 book chapter, 3 review articles, over 60 original papers, numerous proceedings, abstracts and technical reports. Total citation index over 450
- 35 conference presentations and university seminars, 13 of them invited.
- 1 patent (pending)

Education

1996 Ph.D., Physics, Russian Research Center "Kurchatov Institute", Moscow.

1986 M.S. in Physics, Moscow Institute of Physics and Technology (MPTI)

Employment

2005-present Assistant Professor at Physics Department at Southern Illinois University Carbondale
2001-Dec. 2004 Associate Researcher with AFOSR sponsored DURINT project: “Catalysis by nanostructures” at Department of Chemistry & Biochemistry UCSB
1999- 2001 Research Scientist, Chemistry Department of Texas A&M University
1995 –99 (on leave from KSRS) Visiting Researcher at HASYLAB (national synchrotron radiation labs) at DESY, Hamburg, Germany and ELETTRA Synchrotron Radiation Light Source, Trieste, Italy.

1986- 2004 Staff member at Synchrotron Radiation Department (KSRS) of Russian Research Center "Kurchatov Institute", Moscow

Affiliations

Materials Research Society
American Vacuum Society
American Chemical Society

Services

Publication list (reversed chronological order)

60. S. V. Kalinin, J. Shin, S. Jesse, D. Geohegan, A.P. Baddorf, Y. Lilach, M. Moskovits, A. Kolmakov
Electronic Transport Imaging in a Multiwire SnO₂ ChemFET Device *J. Appl. Phys* 2005 98(4)
59. Liu X, Jaramillo TF, **Kolmakov A**, Baeck SH, Moskovits M, Stucky GD, McFarland EW
“Synthesis of Au nanoclusters supported upon a TiO₂ nanotube array” *Journal of Materials Research* 20 (5): 1093-1096
58. A. Kolmakov, D. O. Klenov, Y. Lilach, S. Stemmer, and M. Moskovits **“Enhanced Gas Sensing by Individual SnO₂ Nanowires and Nanobelts Functionalized with Pd Catalyst Particles”** *Nano Letters* 2005, 5(4): 667-673
57. Benz L, Tong X, Kemper P, Lilach Y, Kolmakov A, Metiu H, Bowers MT, Buratto SK **“Landing of size-selected Ag-n(+) clusters on single crystal TiO₂ (110)-(1x1) surfaces at room temperature”** *JOURNAL OF CHEMICAL PHYSICS* 122 (8): Art. No. 081102, 22 2005
56. Tong X, Benz L, Kolmakov A, Chretien S, Metiu H, Buratto SK: **“The nucleation sites of Ag clusters grown by vapor deposition on a TiO₂(110)-1 x 1 surface”** *SURFACE SCIENCE* 575 (1-2): 60-68, 2005
55. Kolmakov A., Moskovits M.: **Chemical sensing and catalysis by one-dimensional metal-oxide nanostructures** *Ann. Rev. Mater. Res.* (review) 2004. 34:151–80
54. Zhang, Y.; Kolmakov, A.; Lilach, Y.; Moskovits, **“Electronic Control of Chemistry and Catalysis at the Surface of an Individual Tin Oxide Nanowire”** *J. Phys. Chem. B.* ; 2005;109 (5): 1923-1929
53. Zhang Y, Kolmakov A, Metiu H, Moskovits M: **Electronic control of catalysis and surface chemistry using the gate potential of a tin oxide nanowire-based field effect transistor.** *Nano Letters* 2003, 3(8),1125
52. Cheng G, Kolmakov A, Zhang Y., Moskovits M., Munden R, Reed M.A., Wang G, Moses D, Zhang. J: **Current Rectification in a Single GaN Nanowire with a Well-Defined p-n Junction.** *Appl. Phys. Lett.* 2003, 83(8), 1578
51. Zhang Y, Kolmakov A, Moskovits M: **Template Synthesis of SnO₂ Nanowires for Gas Sensing Applications.** *Nano Letters* 2003, (to be submitted).
50. Kolmakov A, Zhang Y, Cheng G, Moskovits M: **Detection of CO and oxygen using tin oxide nanowire sensors.** *Advanced Materials* 2003, 997-1000, vol.15(12)
49. Kolmakov A, Goodman DW: **In situ Scanning Tunneling Microscopy of Oxide-Supported Metal Clusters: Nucleation, Growth, and Thermal Evolution of Individual Particles.** *The Chemical Record* 2002, 2 (6): 446-457 review
48. Kolmakov A, Goodman DW: **Size Effect in Catalysis by Supported Metal Clusters** in *“Quantum Phenomena in Clusters and Nanostructures”* ed. by A.W. Castleman, Jr., S.N. Khanna 2003, Springer-Verlag Berlin Heidelberg New York (book chapter)
47. Santra AK, Kolmakov A, Yang F, Goodman DW: **Growth of Au on TiO₂(110) on Cluster-by-Cluster Basis.** *Jpn. J. Appl. Phys.* 2003, 42 (7B): 4795-4798, 2003

46. Kolmakov A, Zhang Y, Moskovits M: **Topotactic Thermal Oxidation of Sn Nanowires: Intermediate Suboxides and Core - Shell Metastable Structures.** *Nano Letters* 2003, 3(8),1125
45. Kolmakov A, Goodman DW: **In situ scanning tunneling microscopy of individual supported metal clusters at reactive gas pressures from 10^{-8} to 10^{-4} Pa.** *Review Scientific Instruments* 2003, Volume 74, Issue 4, pp. 2444-2450
44. Svetchnikov NY, Kolmakov AA, Stankevitch VG: **Photoelectron spectra of submonolayer $C_{60}F_{48}$ films on d-metal substrates.** In *Surface Review and Letters.* ; 2002:1269-1274. vol 9.
43. Yalovega G, Soldatov AV, Riedler M, Pederson MR, Kolmakov A, Nowak C, Moller T: **Geometric structure of $(NaCl)_4$ clusters studied with XANES at the chlorine L-edge and at the sodium K-edge.** In *Chemical Physics Letters.* ; 2002:23-28. vol 356.
42. Hergenbahn U, Kolmakov A, Riedler M, de Castro ARB, Lofken O, Moller T: **Observation of excitonic satellites in the photoelectron spectra of Ne and Ar clusters.** In *Chemical Physics Letters.* ; 2002:235-241. vol 351.
41. Riedler M, de Castro ARB, Kolmakov A, Lofken JO, Nowak C, Soldatov AV, Wark A, Yalovega G, Moller T: **Na 1s photoabsorption of free and deposited NaCl clusters: Development of bond length with cluster size.** In *Physical Review B: Condensed Matter and Materials Physics.* ; 2001:245419/245411-245419/245419. vol 64.
40. Kolmakov A, Goodman DW: **Scanning tunneling microscopy of gold clusters on $TiO_2(110)$. CO oxidation at elevated pressures.** In *Surface Science.* ; 2001:L597-L601. vol 490.
39. Riedler M, de Castro ARB, Kolmakov A, Lofken JO, Nowak C, Soldatov AV, Wark A, Yalovega G, Moller T: **Photoabsorption of NaCl clusters at the Na K-edge: Development of the bond length with the cluster size.** In *Journal of Chemical Physics.* ; 2001:1319-1323. vol 115.
38. Nowak C, Dollefeld H, Eychmuller A, Friedrich J, Kolmakov A, Lofken JO, Riedler M, Wark A, Weller H, Wolff M, et al.: **Innershell absorption spectroscopy on CdS: Free clusters and nanocrystals.** In *Journal of Chemical Physics.* ; 2001:489-494. vol 114.
37. Kolmakov A, Goodman DW: **Imaging gold clusters on $TiO_2(110)$ at elevated pressures and temperatures.** In *Catalysis Letters.* ; 2000:93-97. vol 70.
36. Svehnikov NY, Kolmakov AA, Stankevich VG: **Photoelectron spectra of submonolayer $C_{60}F_{48}$ films on d-metal substrates.** In *Poverkhnost.* ; 2000:33-37.
35. Kolmakov A, Stultz J, Goodman DW: **Characterization of surface defects on MgO thin films by ultraviolet photoelectron and metastable impact electron spectroscopies.** In *Journal of Chemical Physics.* ; 2000:7564-7570. vol 113.
34. Yalovega GE, Soldatov AV, Novak K, Riedler M, Lofken O, Kolmakov A, Moller T: **Local Geometry and Electronic Structure of Free NaCl Clusters.** In *Physics of the Solid State (Translation of Fizika Tverdogo Tela (Sankt-Peterburg)).* ; 2000:1942-1945. vol 42.
33. Kovac J, Gregoratti L, Gunther S, Kolmakov A, Marsi M, Kiskinova M: **Spectromicroscopy study of an Ni + Ag/Si(111) interface.** In *Surface and Interface Analysis.* ; 2000:479-483. vol 30.
32. Kolmakov A, Lofken JO, Nowak C, Picucci F, Riedler M, Rienecker C, Wark A, Wolff M, Moller T: **Argon coated alkali halide clusters: the effect of the coating on the ionization and fragmentation dynamics.** In *Chemical Physics Letters.* ; 2000:465-471. vol 319.
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28. Marsi M, Casalis L, Gregoratti L, Gunther S, Kolmakov A, Kovac J, Lonza D, Kiskinova M: **ESCA microscopy: the first spectro-microscopy beamline operating at ELETTRA.** In *X-Ray Microscopy and Spectromicroscopy, Status Report from the International Conference, 5th, Wuerzburg, Germany, Aug. 19-23, 1996.* ; 1998:402-406.
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24. Kovac J, Gunther S, Kolmakov A, Marsi M, Kiskinova M: **Effect of a composition discontinuity on the evolution of a bimetal interface studied by photoemission microscopy: Au patch deposited on a Ag/Si(111) surface.** In *Surface Review and Letters.* ; 1998:605-613. vol 5.
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22. Kolmakov A, Stankevitch V, Svechnikoc N, Dudin P, Artemiev N, Berger H, Clerc G, Margaritondo G, Kamada M, Hirose S, et al.: **X-trap influence on luminescence and electric properties of C₆₀ single crystal.** In *Nuclear Instruments & Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors, and Associated Equipment.* ; 1998:412-417. vol 405.
21. Kolmakov A, Gunther S, Kovac J, Marsi M, Casalis L, Kaznacheev K, Kiskinova M: **Spectromicroscopy and thermal evolution of an Ag+Au/Si(111) bimetallic interface.** In *Surface Science.* ; 1997:241-250. vol 389.
20. Guenther S, Marsi M, Kolmakov A, Kiskinova M, Noeske M, Taglauer E, Schubert UA, Mestl G, Knoezinger H: **Photoelectron Spectromicroscopic Study of the Spreading Behavior of MoO₃ on Titania and Alumina Model Supports.** In *Journal of Physical Chemistry B.* ; 1997:10004-10011. vol 101.
19. Gunther S, Kolmakov A, Kovac J, Marsi M, Kiskinova M: **Au on Ag/Si(111)-($\sqrt{3}\times\sqrt{3}$)R30 : A spectromicroscopy study of a bimetal-silicon interface.** In *Physical Review B: Condensed Matter.* ; 1997:5003-5013. vol 56.
18. Kovac J, Gunther S, Kolmakov A, Casalis L, Gregoratti L, Lonza D, Marsi M, Kiskinova M: **Photoemission spectro-microscopy at ELETTRA.** In *AIP Conference Proceedings.* ; 1997:753-756. vol 392.
17. Marsi M, Casalis L, Gregoratti L, Guenther S, Kolmakov A, Kovac J, Lonza D, Kiskinova M: **ESCA Microscopy at ELETTRA: what it is like to perform spectromicroscopy experiments on a third generation synchrotron radiation source.** In *Journal of Electron Spectroscopy and Related Phenomena.* ; 1997:73-83. vol 84.
16. Gunther S, Kolmakov A, Kovac J, Casalis L, Gregoratti L, Marsi M, Kiskinova M: **Scanning photoelectron microscopy of a bimetal/Si interface: Au coadsorbed on Ag/Si(111).** In *Surface Science.* ; 1997:145-149. vol 377-379.
15. Kolmakov A, Bertolo M, Fontana S, Gunther S, Kovac J, Marsi M, Kiskinova M: **Interface dynamics and electromigration of the system Au-Ag/Si(111) using photoelectron emission microscopy.** In *Surface Science.* ; 1997:969-974. vol 377-379.

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13. Kolmakov A, Kovac J, Gunther S, Casalis L, Gregoratti L, Marsi M, Kiskinova M: **Ag on Au/Si(111): Interfacial interactions on a submicrometer scale.** In *Physical Review B: Condensed Matter.* ; 1997:4101-4104. vol 55.
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10. Kolmakov A, Stankevitch V, Svechnikov N, Dudin P, Artemev N, Berger H, Clerc G, Margaritondo G, Kamada M, et al.: **Temperature dependence of luminescence intensity and decay times in C₆₀ single crystal.** In *Journal of Electron Spectroscopy and Related Phenomena.* ; 1996:449-452. vol 78.
9. Terekhin MA, Svechnikov NY, Stankevitch VG, Kolmakov AA, Stepanov VA, Bezmelnitsin N, Kamada M, Kan'no K, Akimoto I: **Radiative transitions in C₆₀ thin films under SR excitation.** In *Journal of Electron Spectroscopy and Related Phenomena.* ; 1996:445-448. vol 78.
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7. Kolmakov A, Stankevitch V, Bezmelnitsin V, Rizkov A, Sokolov V, Kamada M, Hirose S: **Luminescence of solid C₆₀F₄₈ and C₇₀F₅₈.** In *Physics and Chemistry of Fullerenes and Derivatives, Proceedings of the International Winterschool on Electronic Properties of Novel Materials, Kirchberg, Austria, Mar. 5-12, 1995.* ; 1995:279-282.
6. Kolmakov AA, Stankevitch VG, Sukhanov LP, Gurtler P, Kraas M: **Ionization of excitons on admixed molecular XeK⁺ ions isolated in solid Xe.** In *Fizika Nizkikh Temperatur (Kiev).* ; 1995:559-564. vol 21.
5. Kolmakov AA, Stankevich VG: **Some aspects of matrix isolation from mass-selected ion beams.** In *Vestnik Moskovskogo Universiteta, Seriya 2: Khimiya.* ; 1995:341-349. vol 36.
4. Terekhin MA, Svechnikov NY, Stankevich VG, Kolmakov AA, Stepanov VA, Bezmelnitsyn VN, Kamada M, Kan'no K: **Dynamics and kinetics of radiative transitions in C₆₀ upon UV and vacuum-UV excitation.** In *Optika i Spektroskopiya.* ; 1995:75-83. vol 78.
3. Kolmakov AA, Starkevitch VG: **Inelastic interaction of low-energy mass-selected ions with the solid xenon surface.** In *Fizika Nizkikh Temperatur.* ; 1994:1178-1181. vol 20.
2. Kolmakov AA, Kul'varkaya BS, Magdeev SN, Morozov LN: **Combined source of Li⁺ and Cs⁺ ions based on binary aluminosilicates.** In *Radiotekhnika i Elektronika (Moscow, Russian Federation).* ; 1993:2092-2096. vol 38.
1. Kink R, Kink M, Soovik T, Stankevich VG, Zabelin AV, Svechnikov NY, Kolmakov AA, Cholakh SO, Pustovarov VA, Polienko AN: **Reflection spectra of lithium hydride crystals in 4-25 eV range at 5 K.** In *Nuclear Instruments & Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors, and Associated Equipment.* ; 1987:138-139. vol A261.

Updated 12.16.05