

List of publications 1991-2014

PhD Thesis

“Sol-gel synthesized In_2O_3 and $\text{MoO}_3\text{-In}_2\text{O}_3$: structural peculiarities and gas sensing properties”

1998, Belarusian State University, Minsk, Belarus

Habilitation / Qualification for a Professorship

“Nanocrystalline metal oxides: from synthesis to gas sensing devices”

2010, Technische Universität Darmstadt, Darmstadt, Germany

Peer-reviewed

- J1. C. Schitco, M.S. Bazarjani, R. Riedel, A. Gurlo, NH_3 -assisted synthesis of microporous silicon oxycarbonitride ceramics from preceramic polymers: a combined N_2 and CO_2 adsorption and small angle X-ray scattering study, *J Mater Chem A* 3 (2015) 805-818
- J2. M.S. Bazarjani, M. M. Muller, H.J. Kleebe, C. Fasel, R. Riedel, A. Gurlo, In situ formation of tungsten oxycarbide, tungsten carbide and tungsten nitride nanoparticles in micro- and mesoporous polymer-derived ceramics, *J Mater Chem A* 2 (2014) 10454-10464.
- J3. M.S. Bazarjani, M.M. Muller, H.-J. Kleebe, Y. Juttke, I. Voigt, M. B. Yazdi, L. Alff, R. Riedel, A. Gurlo, High-temperature stability and saturation magnetization of superparamagnetic nickel nanoparticles in microporous polysilazane-derived ceramics and their gas permeation properties, *ACS Appl Mater Inter* 6 (2014) 12270-12278.
- J4. Y. M. Nikolaenko, Y. E. Kuzovlev, Y. V. Medvedev, N. I. Mezin, C. Fasel, A. Gurlo, L. Schlicker, T. J. M. Bayer, Y. A. Genenko, Macro- and microscopic properties of strontium doped indium oxide, *J Appl Phys* 116 (2014) 043704.
- J5. L. Renard, J. Brotz, H. Fuess, A. Gurlo, R. Riedel, T. Toupance, Hybrid organotin and tin oxide-based thin films processed from alkynylorganotins: synthesis, characterization, and gas sensing properties, *ACS Appl Mater Inter* 6 (2014) 17093-17101.
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- J8. M. F. Bekheet, M. Schwarz, P. Kroll, S. Lauterbach, H.-J. Kleebe, R. Riedel, A. Gurlo, Orthorhombic In_2O_3 – a metastable polymorph of indium sesquioxide, *Angew Chem Int Ed* 52 (2013) 6531–6535.
- J9. M. Seifollahi Bazarjani, M. Hojamberdiev, K. Morita, G. Zhu, G. Cherkashinin, C. Fasel, T. Herrmann, H. Breitzke, A. Gurlo, R. Riedel, Visible light photocatalysis with $\text{c-WO}_{3-x}/\text{WO}_3 \times \text{H}_2\text{O}$ nanoheterostructures in situ formed in mesoporous polycarbosilane-siloxane polymer, *J Am Chem Soc* 135 (2013) 4467–4475.
- J10. M. F. Bekheet, M. Schwarz, M. Müller, S. Lauterbach, H.-J. Kleebe, R. Riedel, A. Gurlo, Phase segregation in Mn-doped In_2O_3 : in-situ high-pressure high-temperature synchrotron studies in multi-anvil assemblies, *RSC Adv* 3 (2013) 5357-5360.
- J11. Y. Juettke, R. M. Prasad, M. Seifollahi Bazarjani, H Richter, I. Voigt, A. Gurlo, R. Riedel, Polymer derived ceramic membranes for gas separation, *Chem Eng Trans* 32 (2013) 1891-1896.

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- J13. L. Wenjie, E. Ionescu, R. Riedel, A. Gurlo, Can we predict the formability of perovskite oxynitrides from tolerance and octahedral factors?, *J Mater Chem A* 1 (2013) 12239-12245.
- J14. G. Miehe, S. Lauterbach, H.-J. Kleebe, A. Gurlo, Indium hydroxide to indium oxide decomposition observed in one nanocrystal during in situ Transmission Electron Microscopy studies, *Journal of Solid State Chemistry*, 198 (2013) 364-370
- J15. M. Pashchanka, R. M. Prasad, R. C. Hoffmann, A. Gurlo, J. J. Schneider, Inkjet printed nanoscaled CuO for miniaturized gas sensing devices, *European Journal of Inorganic Chemistry* 2013 (2013), 1481-1487
- J16. E. Kayhan, R. M. Prasad, A. Gurlo, O. Yilmazoglu, J. Engstler, E. Ionescu, S. Yoon, A. Weidenkaff, J. J. Schneider, Synthesis, characterization, electronic and gas sensing properties towards H₂ and CO of transparent, large area, low layer graphene, *Chemistry - a European Journal*, 18 (2012) 14996-15003
- J17. M. Bekheet, A. Gurlo, K. Morita, R. Riedel, H.-J. Kleebe, T. Sparks, D. R. Clarke, YMnO₃-ZnO thermoelectrics, *Zeitschrift fuer Anorganische und Allgemeine Chemie / Journal of Inorganic and General Chemistry*, 638 (2012) 1630
- J18. L. Renard, O. Babot, H. Saadaoui, H. Fuess, J. Brötz, A. Gurlo, E. Arveux, A. Klein, T. Toupance, Nanoscaled tin dioxide films processed from organotin-based hybrid materials: an organometallic route toward metal oxide gas sensors, *Nanoscale*, 4 (2012) 6806-13
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- J21. M. Hojamberdiev, R. M. Prasad, K. Morita, Y. Zhu, M.A. Schiavon, A. Gurlo, R. Riedel, Template-free synthesis of polymer-derived mesoporous SiOC/TiO₂ and SiOC/N-doped TiO₂ ceramic composites for application in the removal of organic dyes from contaminated water, *Applied Catalysis B*, 115–116 (2012) 303-313
- J22. M. Bekheet, G. Miehe, C. Fasel, A. Gurlo, R. Riedel, Low temperature chemical synthesis of MnIn₂O₄ spinel, *Dalton Transactions*, 41 (2012) 3374-3376
- J23. W. Li, A. Gurlo, E. Ionescu, R. Riedel, Perovskite structure stability in metal oxynitrides, *Zeitschrift fuer Anorganische und Allgemeine Chemie / Journal of Inorganic and General Chemistry*, 638 (2012) 1631
- J24. R.M. Prasad, G. Mera, K. Morita, M. Mueller, H.-J. Kleebe, A. Gurlo, C. Fasel, R. Riedel, Thermal decomposition of carbon-rich polymer-derived silicon carbonitrides leading to ceramics with high specific surface area and tunable micro- and mesoporosity, *Journal of European Ceramic Society*, 32 (2012) 477-484
- J25. A. Gurlo, D. Clarke, High-sensitivity hydrogen detection: hydrogen-Induced swelling of multiple cracked palladium films on compliant substrates, *Angewandte Chemie – International Edition*, 50 (2011) 43, 10130-32 (**highlight**)
- J26. M. Seifollahi Bazarjani, H.-J. Kleebe, M. M. Mueller, C. Fasel, A. Gurlo, R. Riedel, Nanoporous polymer-derived silicon oxycarbonitride ceramics in-situ modified with nickel nanoparticles, *Chemistry of Materials*, 23 (2011) 4112-4123
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- J30. M. Pashchanka, R. C. Hoffmann, A. Gurlo, J. J. Schneider, Molecular based, chimie douce approach to 0D and 1D indium oxide nanostructures. Evaluation of their sensing properties towards CO and H₂, *Journal of Materials Chemistry*, 20 (2010) 8311-8319
- J31. A. Gurlo, R. Riedel, Control of gas sensing activity in tailored nanomaterials for gas sensors, *Z. Anorganische und Allgemeine Chemie / Journal of Inorganic and General Chemistry*, 636 (2010) 2044
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- J37. R. Riedel, A. Gurlo, E. Ionescu, Synthesemethoden für keramische Materialien (Synthesis methods of ceramic materials), *Chemie in Unserer Zeit*, 44 (2010) 208-227 (**review**)
- J38. A. Gurlo, R. Riedel, Active metal electrode-oxide interface in gas sensor operation probed by in-situ time-resolved X-ray spectroscopy, *ChemPhysChem*, 11 (2010) 79-82
- J39. L. Schlicker, R. Riedel, A. Gurlo, Indium hydroxide to bixbyite-type indium oxide transition probed in-situ by time-resolved synchrotron radiation, *Nanotechnology*, 20 (2009) 495702
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- J47. A. Gurlo, Interplay between O₂ and SnO₂: oxygen ionosorption and spectroscopic evidence of adsorbed oxygen, *ChemPhysChem*, 7 (2006) 2041-52 (**minireview**)
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Books

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- B2. A. Gurlo, "Insights into the mechanism of gas sensor operation", in *Metal Oxide Nanomaterials for Chemical Sensors*, Eds.: Michael A. Carpenter, Sanjay Mathur, Andrei Kolmakov, Springer, New York, **2013**, 3-34
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- B6. A. Gurlo, N. Barsan, U. Weimar, "Gas sensors based on semiconducting metal oxides" in *Metal Oxides: Chemistry and Applications*, Ed. J.L.G.Fierro, CRC Press, Boca Raton, **2006**, 683-738
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- B8. A. Taurino, M. Catalano, P. Siciliano, A. Gurlo, N. Barsan, U. Weimar, M. Ivanovskaya, "Tuning of the gas-sensing properties of self-assembled In₂O₃ nanoboxes prepared by sol gel techniques", in *Sensors and Microsystems*, Ed.: C. Di Natale, World Scientific Publishing, Singapore, **2004**. 191-194
- B9. A. Gurlo, M. Ivanovskaya, A. Fuchs, T. Doll, I. Eisele, W. Göpel, "Conductivity and work-function of nanocrystalline In₂O₃ and In₂O₃-MoO₃ sensors for ozone detection" *Eurosensors XII*, Ed.: N.M.White. Bristol: Institute of Physics, **1998**. Vol. 1. P. 621-624

Patent

L.Mädler, E.S.Pratsinis, A.Rössler, U.Weimar, N.Barsan, A.Gurlo, Formation of highly porous gas-sensing layers by deposition of nanoparticles produced by flame spray pyrolysis.

European Patent EP 1820007

WP 20090291024

Proceedings

- Pr1. M. S. Bazarjani, A. Gurlo, R. Riedel, Micro- and mesoporous polymer-derived ceramic nanocomposites with tailored functionalities for energy and environmental applications, *Materials Science Engineering (MSE)*, September 23 - 25, **2014**, Darmstadt, Germany
- Pr2. M.S. Bazarjani, J. Kaspar, A. Gurlo, R. Riedel, Facile single source precursor synthesis of mesoporous nickel hydroxide and nickel oxide nanosheets and their potential for electrochemical applications, *Materials Science Engineering (MSE)*, September 23 - 25, **2014**, Darmstadt, Germany
- Pr3. C. Schitco, M.S. Bazarjani, A. Gurlo, R. Riedel, The effect of ceramic composition and porosity on gas permeation through polymer-derived ceramic membranes, *Materials Science*

- Engineering (MSE)*, September 23 - 25, **2014**, Darmstadt, Germany
- Pr4. C. Schitco, M.S. Bazarjani, A. Gurlo, R. Riedel, Tuning the composition and porosity in polymer-derived ceramics for gas separation applications, *13th International Conference on Inorganic Membranes*, July 6 - 9, **2014**, Brisbane, Australia
- Pr5. A. Gurlo, D. R. Clarke, E. Ionescu, R. Riedel, Thermal conductivity in amorphous polymer-derived ceramics, *Thermal transport at nanoscale, 529th Wilhelm and Else Heraeus Seminar*, April 7-10 **2013**, Bad Honnef, Germany
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- Pr7. M. Seifollahi Bazarjani, M. Hojamberdiev, K. Morita, G. Zhu, T. Herrmann, H. Breitzke, A. Gurlo, R. Riedel, Visible light photocatalysis with Tungsten Oxide hydrate nanowhiskers dispersed in mesoporous polycarbosilane-siloxane polymer, *Third international conference on multifunctional, hybrid and nanomaterials (Hybrid Materials 2013)*, March 3-7 **2013**, Sorrento, Italy
- Pr8. M. Seifollahi Bazarjani, H. J. Kleebe, M. M. Müller, K. Morita, A. Gurlo, R. Riedel, Synthesis approach towards micro- and mesoporous polymer derived ceramics with well-dispersed metallic, metal oxide, carbide and nitride nanoparticles, *Third international conference on multifunctional, hybrid and nanomaterials (Hybrid Materials 2013)*, March 3-7 **2013**, Sorrento, Italy
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- Pr10. C. Schitco, M. Seifollahi Bazarjani, Y. Yütke, I. Voigt, A. Gurlo, R. Riedel, Investigation of the properties of nitride based microporous membranes on various supports using polymer derived ceramic route, *ECerS XIII - the 13th Conference of the European Ceramic Society*, June 23 – 27, **2013**, Limoges, France
- Pr11. W. Li, A. Gurlo, E. Ionescu, R. Riedel, Scheelite to perovskite transition induced by nitrogen substitution in metal oxynitrides, *ECerS XIII - the 13th Conference of the European Ceramic Society*, June 23 – 27, **2013**, Limoges, France
- Pr12. R.M. Prasad, A. Gurlo, R. Riedel, Protecting coatings for gas sensors operating under extreme conditions, *MRS Fall Meeting*, November 25-30, **2012**, Boston, USA
- Pr13. T. Sparks, A. Gurlo, R. Seshadri, D. R. Clarke, Carrier concentration insensitivity on thermopower in strongly correlated $\text{Li}_x\text{Mg}_{1-x}\text{Mn}_2\text{O}_4$, *MRS Fall Meeting 2012*; November 25-30 **2012**, Boston, USA
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- Pr15. W.Li, A. Gurlo, E. Ionescu, R. Riedel, Formability of oxynitrides perovskites, *The Euroscience Open Forum 2012 and Marie Curie Actions Conference 2012*, 9. -15. July **2012**, Dublin, Ireland
- Pr16. W. Li, A. Gurlo, E. Ionescu, R. Riedel, Formability of perovskite oxynitrides, *6th International Workshop on Spinel Nitrides and Related Materials*, 9. -14. September 2012, Ruedesheim/Rhine, Germany
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- applications, *The 12th International Conference on Inorganic Membranes*, 9-13 July **2012**, University of Twente, Enschede, The Netherlands
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- Pr58. D. Orlik, M. Ivanovskaya, P. Bogdanov, A. Gurlo, S. Kudriavzev, V. Zuravskiyi. Ceramic sensors prepared by the sol-gel method. *Sensor-96*. Gursuf, Ukraine, **1996**. Proceedings, Vol.2. P. C.245-246 (2 pages).
- Pr59. A. Gurlo, V. Astashko. Ceramic with mixed conductance based on the cobaltites of lanthanides. *The 2nd Republican Conference of Young Scientists and Students*, May 29-31, **1991**, Minsk, Belarus, Book of Abstracts, P. 44-45 (2 pages).

Invited presentations

Conferences

- Polymer derived ceramic nanocomposites with tailored functionalities for energetic and environmental applications*
10th Pacific Rim conference on ceramic and glass technology, San Diego, USA, June 2013
- Polymer derived porous silicon-based ceramics for membrane applications*
MRS Fall Meeting, Boston, USA, November 2012
- The thermal conductivity of polymer derived amorphous Si-C-O compounds*
MS&T'12 - Materials Science and Technology 2012 Conference & Exhibition, Pittsburgh, USA, October 2012
- Degradation phenomena and long-term stability of In_2O_3 and SnO_2 gas sensors*
MSE 2012, Materials Science and Engineering, Darmstadt, Germany, September 2012
- Catalysts, membranes and sensors for the hydrogen economy*
The 36th International Conference and Exposition on Advanced Ceramics and Composites, Daytona Beach, USA, January 2012
- Polymer-derived ceramics with tunable micro- and mesoporous structure for hydrogen separation*
3rd International Congress on Ceramics, Osaka, Japan, November 2010
- Solvothermal and high pressure synthesis of oxide and nitrides (plenary lecture)*
Sviridov Readings 2010 - International conference on chemistry and chemical education, Belarusian State University, Minsk, Belarus, Minsk, Belarus, April 2010
- Materials engineering for sensors*
Symposium Nanostructured Materials and Systems, 8th PacRim Conference on Ceramics and Glass Technology, Vancouver, Canada, June 2009
- Toward nanosensor technology: materials, methods and mechanisms (plenary lecture)*
Nanomeeting 2009, Minsk, Belarus, May 2009
- Gas sensors based on semiconducting metal oxides*
Research and Educational Network on Nanomaterials and Nanotechnology for Renewables, Ankara, Turkey, November 2008
- Control over structure and morphology of sensing materials in the "living" sensors*
VI International Workshop on Semiconductor Gas Sensors, Zakopane, Poland, September 2008
- In situ and operando studies of catalytic and sensing reactions*
Workshop on surface/adsorbed oxygen on metal oxides; role in gas sensing and catalysis, Tübingen, Germany, June 2008
- Rapid quality monitoring of packaging materials*
Rapid Methods Europe 2005: International Conference and Marketplace Rapid Methods for Food and Feed Quality Determination, Noordwijk aan Zee, The Netherlands, May 2005
- Basic understanding of sensing with metal oxide based chemical sensors*
105th Annual Meeting and Exposition of the American Ceramic Society, Nashville, USA, April 2003
- Semiconductor sensors based on sol-gel obtained nanostructured semiconductor oxides*
The MTEC Conference for Sensors and Transducers, Birmingham, UK, February 2000
- Sol-gel nanocrystalline oxides*

Seminars

1. *Ceramic Materials for Energy and Environment: from Synthesis to Device Fabrication*
Friedrich-Schiller-Universität Jena, April 2012
2. *Materials for Energy and Environment Applications: from Synthesis to Device Fabrication*
Universität Siegen, February 2012
3. *Materials for Energy and Environment Applications: Design, Synthesis and Characterization*
BASF, February 2012
4. *Materials for Energy and Environment Applications: from Synthesis to Device Fabrication*
Christian-Albrechts-Universität zu Kiel, January 2012
5. *Ceramic Materials for Energy and Environment Applications: from Synthesis to Device Fabrication*
Institut für Energie- und Klimaforschung, IEK-1: Werkstoffsynthese & Herstellungsverfahren, FZ Jülich, September 2011
6. *Materials for Energy and Environment: Synthesis, Characterization and Performance*
Leibniz Institute for Solid State and Materials Research (IFW), Dresden, April 2011
7. *Materials for Energy and Environment*
Karlsruhe Institute of Technology (KIT), Karlsruhe, April 2011
8. *Materials for Energy and Environment: an inter- and multidisciplinary approach*
Anorganische Chemie, Ulm University, April 2011
9. *Thermoelectric materials for energy harvesting*
Habilitation seminar, **Technische Universität Darmstadt**, Germany, June 2010
10. *Nanocrystalline metal oxides for gas sensing applications*
Physikalisches Colloquium, Justus-Liebig-Universität-Giessen, Germany, February 2010
11. *Gas sensors based on semiconducting metal oxides*
Technical University Dresden, Germany, June 2009
12. *Nanocrystalline metal oxides for gas sensing applications: synthesis, functionalisation, and integration*
"Particle Synthesis", Cluster of Excellence "Engineering of Advanced Materials", Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany, June 2008
17. *Stimuli-Responsive Oxide and Non-Oxide Ceramics*
Mini-Symposium: Assistant Professorship for Functional Ceramic Materials, Department of Materials, Mini-Symposium "Functional Ceramic Materials", **ETH Zuerich, Switzerland**, February 2008
13. *Nanocrystalline metal oxides for gas sensing applications*
Materials Science Colloquium, Technische Universität Darmstadt, Germany, June 2008
14. *In situ and operando characterisation of catalysts and sensors*
University of Twente, Netherlands, November 2007
15. *Nanocrystalline metal oxides: from synthesis to gas sensing applications*
Special Characterisation Seminar, University of Oxford, UK, Department of Materials, July 2007
16. *Gas sensors based on semiconducting metal oxides*
Research Seminar, University of York, UK, Department of Chemistry, Chair: Professor Simon
Prof. Dr. A. Gurlo, List of publications till 2014, 11/ 12

Duckett, June 2007

17. *Nanocrystalline metal oxides: from synthesis to gas sensing applications. SnO₂, In₂O₃ and WO₃ case studies*
Surface Science Division, **Technische Universitaet Darmstadt**, Darmstadt, Germany, February 2007
18. *Nanocrystalline metal oxides: synthesis, structure and properties*
Max-Planck-Institute for Solid State Research, Stuttgart, Germany, January 2006
19. *Gas sensors, sensor arrays and sensor systems with sensitive nanocrystalline metal-oxides*
Department of Mechanical Engineering, Chair of Micro- and Nano-Scale Engineering, **Technical University Eindhoven**, November 2005
20. *Gas sensing: biological inspiration, basic understanding and technical realization*
Max-Planck-Institute of Colloids and Interfaces, Golm, Germany, October 2005
21. *Grain size control in nanocrystalline In₂O₃ semiconductor gas sensors*
Universität der Bundeswehr München, Institute of Physics, Lehrstuhl für Mikrosystemtechnik, Munich, Germany, October 1996

Keynotes

1. *Polymer-derived ceramic/metal nanocomposites*
Powder metallurgy world congress and exhibition (PM2012), Yokohama, Japan, October 2012
2. *Shape-, size- and phase-controlled indium oxide for gas sensing* (supported presentation at the Focused Session on Advanced Sensor Design)
The 7th IEEE Conference on Sensors: IEEE SENSORS 2008, Special focused session "Advanced chemical sensors by rational chemical design", Lecce, Italy, October 2008
3. *Possibilities and limitations of spectroscopic techniques for in situ and operando studies on gas sensors: an attempt of review* (keynote presentation)
Operando-II: Second International Congress on Operando Spectroscopy: Fundamental and Technical Aspects of Spectroscopy of Catalysts under Working Conditions, Toledo, Spain, April 2006
4. *High performance porous metal oxide sensors via single-step fabrication* (distinguished contribution)
Eurosensors XIX: The 19th European Conference on Solid-State Transducers, Barcelona, Spain, September 2005