

**Dr. Alexey Dronov**

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## **Curriculum Vitae**

### **Affiliation and official address:**

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**Date and place of birth:** September 10, 1985, Moscow, Russia

### **Research Interests:**

General physics, materials science and engineering, physics of solid state, electrochemistry, nanostructured anodic oxides, deposition in porous matrices, SILAR, photovoltaics, photocatalysis, energy storage devices, sol-gel processes, low-temperature synthesis processes of functional nanomaterials.

### **Professional education:**

2008 Engineer of Microelectronics and Solid State Electronics, Moscow State Institute of Electronic Technology, Moscow, Russia

2013 Ph.D. in Engineering and Technology, National Research University of Electronic Technology, Moscow, Russia

### **Research and Professional Experience:**

09/2013 – 09/2016 PostDoc at the Department of the Materials of Functional Electronics at the National Research University of Electronic Technology (MIET), Moscow, Russia

09/2016 – 09/2017 Assistant Prof. at the Department of the Materials of Functional Electronics at the National Research University of Electronic Technology (MIET), Moscow, Russia

09/2017 – present Assistant Prof. / Senior Researcher / vice-director for science activities of Institute of Advanced Materials and Technologies (AM&T) in National Research University of Electronic Technology (MIET), Moscow, Russia

### **Cumulative Total Number of Articles Published in Peer Reviewed Journals:**

31 papers in peer reviewed journals, one book. H-index: 5

### Publications:

1. Gavrilov, S.A., Dronov, A.A., Shevyakov, V.I., Belov, A.N., Poltoratskii, E.A., 2009. Ways to increase the efficiency of solar cells with extremely thin absorption layers. *Nanotechnologies in Russia* 4, 237–243. doi:10.1134/S1995078009030112
2. Gavrilov, S.A., Zheleznyakova, A.V., Dronov, A.A., Ditiirich, T., 2009. Efficiency enhancement of eta-cells fabricated by silar deposition, in: *Physics, Chemistry and Application of Nanostructures - Proceedings of the International Conference, NANOMEETING 2009*. pp. 577–580.
3. Belov, A.N., Gavrilin, I.M., Gavrilov, S.A., Dronov, A.A., 2011. Specific features of the morphology of titanium oxide films prepared by pulling silicon substrates from a solution. *Semiconductors* 45, 1653–1655. doi:10.1134/S1063782611130045
4. Belov, A.N., Volosova, Y.V., Gavrilov, S.A., Dronov, A.A., Zheleznyakova, A.V., Nazarkin, M.Y., Shevyakov, V.I., 2012. Low-temperature methods for the synthesis of nanostructured titanium and zinc oxides with a prescribed morphology. *Semiconductors* 46, 1608–1612. doi:10.1134/S1063782612130040
5. Silibin, M.V., Dronov, A.A., Gavrilov, S.A., Smirnov, V.V., Kiselev, D.A., Malinkovich, M.D., Parkhomenko, Y.N., 2013. PZT thin films synthesis by sol-gel method and study of local ferroelectric properties. *Ferroelectrics* 442, 95–100. doi:10.1080/00150193.2013.776433
6. Kiselev, D.A., Silibin, M.V., Dronov, A.A., Gavrilov, S.A., Roshchin, V.M., Malinkovich, M.D., Parkhomenko, Y.N., 2013. Synthesis and studies of local of ferroelectric properties of lead zirconate titanate thin films obtained by sol-gel technique. *Inorganic Materials: Applied Research* 4, 400–404. doi:10.1134/S2075113313050080
7. Belov, A.N., Gavrilin, I.M., Gavrilov, S.A., Dronov, A.A., Labunov, V.A., 2013. Effect of the activity of fluorine-containing electrolytes on reaching the maximum thickness of porous anodic titanium oxide. *Semiconductors* 47, 1707–1710. doi:10.1134/S1063782613130034
8. Dronov, A., Gavrilin, I., Zheleznyakova, A., 2014. New generation photoelectric converter structure optimization using nano-structured materials, in: *Proceedings of SPIE - The International Society for Optical Engineering*. doi:10.1117/12.2180871
9. Gavrilov, S., Zheleznyakova, A., Dronov, A., Presnukhina, A., Popova, E., 2014. Different methods of forming multicomponent metal sulfide by silar-techniques, in: *Proceedings of SPIE - The International Society for Optical Engineering*. doi:10.1117/12.2180700
10. Pyatilova, O.V., Gavrilov, S.A., Dronov, A.A., Grishina, Y.S., Belov, A.N., 2014. Role of Ag<sup>+</sup> ion concentration on metal-assisted chemical etching of silicon. *Solid State Phenomena* 213, 103–108. doi:10.4028/www.scientific.net/SSP.213.103
11. Gavrilov, S.A., Dronov, A.A., Kitsyuk, E.P., Lebedev, E.A., Terashkevich, I.M., 2015. Ultrathin metal oxides layer on a carbon nanotube oriented arrays surface formation process development and study for supercapacitors electrode specific capacity increasing. *Biomedical and Pharmacology Journal* 8, 731–739. doi:10.13005/bpj/820
12. Gavrilov, S.A., Dronov, A.A., Dronova, D.A., Terashkevich, I.M. The influence of recombination barrier Al<sub>2</sub>O<sub>3</sub> layer thickness formed by ALD on ETA-cell efficiency (2015) *Research Journal of Pharmaceutical, Biological and Chemical Sciences*, 6 (3), pp. 1881-1889.
13. Lebedev, E.A., Kitsyuk, E.P., Gavrilin, I.M., Gromov, D.G., Gruzdev, N.E., Gavrilov, S.A., Dronov, A.A., Pavlov, A.A., 2015. Fabrication technology of CNT-Nickel Oxide based planar pseudocapacitor for MEMS and NEMS. *Journal of Physics: Conference Series* 643. doi:10.1088/1742-6596/643/1/012092
14. Gavrilin, I.M., Dronov, A.A., Shilyaeva, Y.I., Lebedev, E.A., Kuzmicheva, M.S., Savchuk,

- T.P., Gavrilov, S.A., 2016. Improved photoanode structure based on anodic titania nanotube array covered by TiO<sub>2</sub>-NPs/nanographite composite layer for ETA-cells. *Journal of Physics: Conference Series* 741. doi:10.1088/1742-6596/741/1/012100
15. Sikolenko, V., Troyanchuk, I. O., Bushinsky, M. V., Karpinsky, D. V., Efimov, V., Ritter, C., ... Schilling, F. R. (2016). High pressure effects on the magnetic and crystal structure of La<sub>0.75</sub>Ba<sub>0.25</sub>CoO<sub>3</sub>. *Materials Chemistry and Physics*, 181, 78–81. doi:10.1016/j.matchemphys.2016.06.035
  16. Dronov, A.A., Dronova, D.A., Kirilenko, E.P., Terashkevich, I.M., Gavrilov, S.A., 2017. Studying composition of Al<sub>2</sub>O<sub>3</sub> thin films deposited by atomic layer deposition (ALD) and electron-beam evaporation (EBE) upon rapid thermal processing. *International Journal of Applied Engineering Research*, volume 12, Issue 4, 2017, Pages 428-433.
  17. Yarmolich, M. V., Kalanda, N. A., Yaremchenko, A. A., Gavrilov, S. A., Dronov, A. A., Silibin, M. V., 2017. Sequence of phase transformations and inhomogeneous magnetic state in nanosized Sr<sub>2</sub>FeMoO<sub>6</sub> –  $\delta$  *Inorganic Materials*, 53(1), 96–102. doi:10.1134/s0020168517010186
  18. Nazarkina, Y., Kamnev, K., Dronov, A., Dudin, A., Pavlov, A., & Gavrilov, S., 2017. Features of Porous Anodic Alumina Growth in Galvanostatic Regime in Selenic Acid Based Electrolyte. *Electrochimica Acta*, 231, 327–335. doi:10.1016/j.electacta.2017.02.049
  19. Gavrilin, Ilya, Timofey Savchuk, Alexey Dronov, and Tatiana Kulova. "TiO<sub>2</sub> Nanotubular Arrays as Anode Materials for Li-Ion Batteries." 2017 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIConRus) (2017). doi:10.1109/eiconrus.2017.7910830.
  20. Dronov, A., Gavrilin, I., Dronova, D., Savchuk, T., Kirilenko, E. Enhanced photocatalytic properties of carbon doped TNT's formed in organic based electrolytes (2017) *Proceedings of the 2017 IEEE Russia Section Young Researchers in Electrical and Electronic Engineering Conference, EIConRus 2017*, pp. 1385-1387. doi: 10.1109/eiconrus.2017.7910827
  21. Dronov, Alexey, Daria Dronova, Elena Kirilenko, Andrey Goryachev, and Igor Terashkevich. "Al<sub>2</sub>O<sub>3</sub> Films (ALD) Elemental Composition Study by ToF-SIMS at Different Thermal Processing." 2017 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIConRus) (2017). doi:10.1109/eiconrus.2017.7910755.
  22. Gavrilin, I. M., D. G. Gromov, A. A. Dronov, S. V. Dubkov, R. L. Volkov, A. Yu. Trifonov, N. I. Borgardt, and S. A. Gavrilov. "Effect of Electrolyte Temperature on the Cathodic Deposition of Ge Nanowires on in and Sn Particles in Aqueous Solutions." *Semiconductors* 51, no. 8 (August 2017): 1067–1071. doi:10.1134/s1063782617080115.
  23. Dronov, Alexey, Ilya Gavrilin, Elena Kirilenko, Daria Dronova, and Sergey Gavrilov. "Investigation of Anodic TiO<sub>2</sub> Nanotube Composition with High Spatial Resolution AES and ToF SIMS." *Applied Surface Science* 434 (March 2018): 148–154. doi:10.1016/j.apsusc.2017.10.132.
  24. Gavrilov, Sergey A., Alexey A. Dronov, Ilya M. Gavrilin, Roman L. Volkov, Nikolay I. Borgardt, Alexey Yu. Trifonov, Alexander V. Pavlikov, Pavel A. Forsh, and Pavel K. Kashkarov. "Laser Crystallization of Germanium Nanowires Fabricated by Electrochemical Deposition." *Journal of Raman Spectroscopy* 49, no. 5 (February 21, 2018): 810–816. doi:10.1002/jrs.5353.
  25. Gavrilin, I. M., Smolyaninov, V. A., Dronov, A. A., Gavrilov, S. A., Trifonov, A. Y., Kulova, T. L., Kuz'mina, A.A., Skundin, A. M. (2018). Electrochemical insertion of sodium into nanostructured materials based on germanium. *Mendeleev Communications*, 28(6), 659–660. doi:10.1016/j.mencom.2018.11.034
  26. Gavrilin, I. M., Smolyaninov, V. A., Dronov, A. A., Gavrilov, S. A., Trifonov, A. Y., Kulova, T. L., Skundin, A. M. (2018). Study of the Process of Reversible Insertion of Lithium into

- Nanostructured Materials Based on Germanium. *Russian Journal of Electrochemistry*, 54(12), 1111–1116. doi:10.1134/s1023193518120054
27. Nazarkina, Y., Rusakov, V., Salnikov, A., Dronov, A., & Dronova, D. (2019). Influence of Anodic Oxidation and Post-Processing Conditions on the Morphology and Photocatalytic Properties of Nanostructured WO<sub>3</sub> Layers. 2019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIconRus). doi:10.1109/eiconrus.2019.8657293
  28. Savchuk, T., Yakubov, A., Gavrilin, I., Dronova, D., & Dronov, A. (2019). Influence of Thermal Post-Treatment on Electrophysical Properties of Carbon Modified Anodic TiO<sub>2</sub> NTs. 2019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIconRus). doi:10.1109/eiconrus.2019.8656652
  29. Savchuk, T., Pinchuk, O., Kamaleev, M., Dronova, D., & Dronov, A. (2019). SILAR Preparation of CuO Nanoparticles on TiO<sub>2</sub> Sol-Gel Layer for Efficient Visible Light Photocatalysis. 2019 IEEE Conference of Russian Young Researchers in Electrical and Electronic Engineering (EIconRus). doi:10.1109/eiconrus.2019.8657252
  30. Pavlikov, Alexander V., Pavel A. Forsh, Pavel K. Kashkarov, Sergey A. Gavrilov, Alexey A. Dronov, Ilya M. Gavrilin, Roman L. Volkov, Nikolay I. Borgardt, Sofia N. Bokova-Sirosh, and Elena D. Obraztsova. "Investigation of the Stokes to anti-Stokes Ratio for Germanium Nanowires Obtained by Electrochemical Deposition." *Journal of Raman Spectroscopy* 51, no. 4 (February 4, 2020): 596–601. doi:10.1002/jrs.5834.
  31. Gavrilin, Ilya, Alexey Dronov, Roman Volkov, Timofey Savchuk, Daria Dronova, Nikolay Borgardt, Alexander Pavlikov, Sergey Gavrilov, and Dmitry Gromov. "Differences in the Local Structure and Composition of Anodic TiO<sub>2</sub> Nanotubes Annealed in Vacuum and Air." *Applied Surface Science* 516 (June 2020): 146120. doi:10.1016/j.apsusc.2020.146120.

**Collaborators:**

Prof. H. Terryn (Vrije University of Brussels), Dr. D. Kiselev (National University of Science and Technology "MISiS"), Prof M. L. Zheludkevich (Helmholtz-Zentrum Geesthacht - Zentrum für Material- und Küstenforschung GmbH, MagIC - Magnesium Innovation Centre), Prof. V. A. Labunov (Belarusian State University, Minsk, Belarus), Prof. Th. Ditirich (Helmholtz-Zentrum Berlin für Materialien und Energie (HZB), Berlin, Germany), Tomasz Maniecki Ph.D., D.Sc. (Lodz University of Technology).