

CURRICULUM VITAE **Alexander A. Fridman,**
Nyheim Chair Professor,
Director of Drexel Plasma Institute,
Department of Mechanical Engineering and Mechanics,
Drexel University

DATE OF BIRTH: April 17, 1953
PLACE OF BIRTH: Kiev, USSR /Ukraine/
FAMILY STATUS: Married, 2 children /son b.1978 and son b.1983/
HOME ADDRESS: 36 John James Audubon, Marlton, NJ 08053.
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LANGUAGES: Russian, English, French, Ukrainian, Hebrew, Polish.

EDUCATION AND DEGREES

M.S., B.S. in Physics & Engineering, Moscow Inst. of Physics & Technology, 1976.

Ph.D. in Physics & Math., Moscow Institute of Physics & Technology, 1979.

Doctor of Science in Physics & Math., Kurchatov Institute of Atomic Energy, 1987.

Federal Degree of Professor has been awarded by the USSR government, 1990.

MAJOR RESEARCH ACHIEVEMENTS:

- Creation of non-equilibrium kinetics of chemical processes in non-thermal plasma.
- Discovery of selective stimulation of chemical processes in plasma (examples: CO₂ dissociation, H₂ production, fuel conversion, H₂S decomposition).
- Plasma stimulation of chain reactions, first investigations of plasma-catalysis.
- Discovery of non-thermal Gliding Arc / Tornado discharges
- Development of the world most powerful pulsed corona discharges, applications for air cleaning.
- Generation of powerful non-equilibrium plasma in water, application for large-scale water sterilization.
- Discovery of direct plasma treatment of living tissue, creation of direct plasma medicine (wound treatment, blood coagulation, treatment of skin diseases).

EXPERIENCE:

Drexel University, Nyheim Chair Professor, Director of the Drexel Plasma Institute, MEM Department (September 2002 - present).

University of Illinois at Chicago, Professor of the Department of Mechanical and Industrial Engineering, S. Kaplan University Scholar (1995 - 2002).

Kurchatov Institute of Atomic Energy, Moscow, Director of the Theoretical Laboratory (1990-1995), Principal Research Scientist (1988-1990), Senior Research Scientist (1985-1988), Junior Research Scientist (1980-1985), Research Associate (1972-1980).

University of Orleans, France, Professor, Faculte de Science, GREMI, 1992-1994.

Mendeleev University of Chemical Technology, Moscow, Professor of Physics (1987-1995), Professor of Higher College of Chemistry (1992-1995), Associate Professor (1982-1987), Assistant Professor (1981-1982).

Ohio State University, Visiting Professor of Mechanical Engineering, 1993-1994.

University of Padova, Italy, Visiting Professor of the Department of Electrical Engineering, 1991.

Warsaw University, Poland, Visiting Professor of Chemical Engineering Department, 1989.

Moscow Institute of Aerospace Engineering, Assistant Professor (1977-1981).

MAIN HONORS AND AWARDS:

2006 – *Outstanding Research Award*, Drexel University.

2006 – *Gordon Research Award 2006* for the GRC chairs

2005 – *Board of Directors of International Plasma Chemistry Society*.

2003 – *Kurchatov Medal* for Achievements in Science and Technology.

2002 – *Nyheim Chair Professorship* in mechanical engineering and mechanics.

2001- *University of Illinois at Chicago Faculty Research Award*.

2001- Nominated Member of the *Russian National Academy of Sciences*.

1999 – *Kaplan University Professor* in Chemical Kinetics and Energy Systems (Endowed Professorship established in University of Illinois at Chicago by the Jarson-Kaplan Foundation)

1998/1999 – *Dupont Research Award* for non-thermal plasma treatment of organic materials.

1994 – *G. Soros Distinguished Professor* in Physics, endowed Professorship awarded to the most renowned scientists in Russia

1992 - *The Best Professor Award*, main award of the Mendeleev University, Moscow.

1989 - *State Prize of the USSR*. The highest reward for scientists in Russia (originally-the Stalin Prize, later combined with the Lenin Prize to form the only State Prize of the USSR). The State Prize was given for discovery of selective stimulation of chemical processes in plasma (together with the Nobel Prize laureate N.G.Basov).

1988 - *Chernobyl Award* for participation and significant contribution to recovery works after the severe nuclear accident in 1986.

1984 – *USSR Kurchatov Prize* for discovery of gas-dynamics stimulation of chemical reactions in supersonic plasma flows.

1980 – *USSR Kurchatov Prize* for investigations of vibrational kinetics in non-equilibrium plasma.

TOTAL NUMBER OF ADVISED STUDENTS, COMPLETED THEIR DEGREE:
PhDs - 18, MS – 39.

GRADUATE STUDENTS COMPLETED Ph.D. OVER LAST 3 YEARS:

- 1). Kamilla Iskenderova (2003).
- 2). Ankit Desai (2004).
- 3). Alexander Chirokov (2006).

CHAIRING OF RECENT ORGANIZING COMMITTEES AND SESSIONS OF INTERNATIONAL SYMPOSIUMS AND CONFERENCES

1. Chairman of the Organizing Committee, Gordon Conference on Plasma Processing Science, 2006, New Hampshire, USA.
2. Session Chairman, International Conference on Plasma Science, ICOPS-2006, Detroit, USA.
3. Member of Int. Org. Committee & Session Chairman, 18-th International Symposium on Plasma Chemistry, 2007, Kyoto, Japan.

4. Session Chairman, International Symposium on High Technology Plasma Processes, HTTP-8, 2006, St. Petersburg, Russia.

FIELDS OF RESEARCH:

1. Chemical processes and technologies in plasmas: organic and inorganic surface treatment, conversion and purification of gases, fuel treatment, decomposition of carbon dioxide, water vapor, methane, hydrogen sulfide, silane, metal halogenides e.a., synthesis of organic compounds, ozone, nitrogen oxides, halogenides of noble gases, diamond film deposition e.a., oxidation of organic and inorganic compounds, isotope separation e.a.
2. Physics and engineering of gas discharges. High temperature fluid mechanics, heat and mass transfer processes. Microwave, radio- frequency, arc (including such non-traditional one as gliding arc), glow, barrier, corona, plasma- beam discharges and non-self-sustained discharges, stimulated by relativistic electron beams, discharges in supersonic gas flow. Discharge kinetics and electrodynamics. Discharge plasma- surface interaction. Diagnostics of discharge plasma and excited molecular gases.
3. Combustion kinetics and fluid dynamics. Formation of soot and nano-structures, filtration combustion in porous medium, super-adiabatic combustion processes, combustion synthesis, oxy-fuel and low NO_x-burners.
4. Quantum and classical theory of elementary chemical reaction. Elementary reaction of vibrationally excited molecules. Reaction and relaxation processes for polyatomic molecules. Computer methods for chemical reaction rate calculations.
5. Physical and chemical kinetics of non-equilibrium systems. Vibrational distribution functions in plasma and gases. Chemical and plasma- chemical reactions in gas flow, including rotating and supersonic one. Physical and chemical kinetics of shock wave propagation. Computational methods in chemical kinetics and thermodynamics.
6. Elementary processes and kinetics of clusterization, nano-particle growth in plasma, ion-catalysis, condensation and dusty plasma formation. Aerosols precipitation. Ionization processes in dusty plasma: breakdown, electron beam-, photo- and thermo- ionization. Heterogeneous catalysis, including plasma catalysis.
7. Polymer membranes for gas separation. Theory of polymer permeability. Plasma modification of polymer membrane surface. Kinetics of polymer oxidation in gas and plasma.
8. Relativistic electron beams: electrodynamics and chemical processes. Ecology, industrial flue gases purification. SO₂, NO, H₂S, volatile organic compounds oxidation in airflow by electron beams, pulse corona and other non-equilibrium discharges.
9. Hydrogen energy. Plasma-, electro- and photo- chemical methods of hydrogen production.

Hydrogen production and H₂S treatment in microwave and RF- discharges. Plasma chemistry in ecology of oil refining and natural gas processing.

10. Nuclear safety, hydrogen safety of nuclear power plants. Modeling of hydrogen generation: water- zirconium reaction, water radiolysis e.a. Deflagration and detonation of hydrogen- air mixtures.

11. Plasma in biology, sterilization of air and water flows, sterilization of surfaces, sterilization of medical instruments.

12. Plasma in bio-medical systems, interaction of non-thermal plasma with living tissue, plasma treatment of wounds, blood coagulation and pre-surgery sterilization, plasma treatment of skin diseases.

PUBLICATIONS: *6 books and over 450 papers* in scientific journals and proceedings of Conferences.

LIST OF SELECTED PUBLICATIONS:

BOOKS:

1. A.Fridman, L.Kennedy. Plasma Physics and Engineering, 860 pg. Taylor & Francis, N.Y., L., April, 2004.

2. V.D.Rusanov, A.A.Fridman. Physics of Chemically Active Plasma. NAUKA, Moscow, 1984, 416p. /In Russian/.

3. V.K.Givotov, V.D.Rusanov, A.A.Fridman. Diagnostics of Non- equilibrium Chemically Active Plasma. ATOMIZDAT, Moscow, 1985, 216p. /In Russian/.

4. M.Capitelli, M.Cacciatore, S.De Benedictis, A.A.Fridman e.a. Non-equilibrium Vibrational Kinetics. Topics in Current Physics, SPRINGER-VERLAG, Ed. by M.Capitelli, Berlin, N.-Y.,L., 1988, 344p.

/Russian translation by A.A.Fridman and S.A.Nester was published in MIR, Moscow, 1989, 392p./

5. A.Fridman, A.Levitsky, S.Nester, B.Potapkin, V.Rusanov, B.Trusov. Kinetical and Statistical Modeling of Chemical Reactions in Gas Discharge. ATOMINFORM, Moscow, 1988, 224p. /In Russian/.

6. A.I.Filippov, A.Fridman, E.M.Deviatkin “Kinetics of Gas Filtration Processes”, Russian Academy of Sciences, Sterlitamak, 2001, 176p. /In Russian/.

NEW BOOKS ACCEPTED FOR PUBLICATION:

1. A.Fridman "Plasma Chemistry" (Cambridge University Press, accepted for publication in 2007).
2. V.Rusanov, A.Fridman, B.Potapkin, Physics of Chemically Active Plasma (Gordon and Breach Publishing Co., UK, translation from Russian, accepted for publication, 2007).

REVIEWS AND BOOK CHAPTERS:

1. V.D.Rusanov, A.A.Fridman, G.V.Sholin. The Physics of a Chemically Active Plasma with Non-equilibrium Vibrational Excitation of Molecules. Sov. Phys. Usp. /Successes in Soviet Physics/, American Inst. of Physics, v.24(6), 1981, p.447-474.
2. A.A.Fridman, V.P.Bochin, V.A.Legasov, V.D.Rusanov. Water Decomposition in the Discharge, Stimulated by Relativistic Electron Beam. In the book: Atomic-Hydrogen Energy and Technology, v.1, Moscow, ATOMIZDAT, 1978, p.183-213. /In Russian/.
3. A.A.Fridman, V.A.Legasov, V.D.Rusanov. Non-equilibrium Plasma- Chemical Processes in Heterogeneous Systems. In the book: Plasma Chemistry, v.5, Moscow, ATOMIZDAT, 1978, p.116-148, ibid. p.222- 262. /In Russian/.
4. A.A.Fridman, V.P.Bochin, V.A.Legasov, V.D.Rusanov. Water Decomposition in Non-equilibrium Plasma. In the book: Atomic- Hydrogen Energy and Technology, v.2, Moscow, ATOMIZDAT, 1979, p.206-232. /In Russian/.
5. V.D.Rusanov, V.K.Givotov, A.A.Fridman. Carbon Dioxide Dissociation in Non-equilibrium Plasma. In the book: Plasma Chemistry, v.9, Moscow, ATOMIZDAT, 1982, p.206-235. /In Russian/.
6. V.A.Legasov, R.I.Asisov, A.A.Fridman e.a. Hydrogen Production in the Double Stage Carbon Oxide's Cycle. In the book: Atomic- Hydrogen Energy and Technology, v.5, Moscow, ATOMIZDAT, 1983, p.84-106, ibid. p.71-84. /In Russian/.
7. A.A.Fridman, A.A.Levitsky, S.O.Macheret. Mathematical Modeling of Non-equilibrium Plasmachemical Processes Stimulated by Vibrational Excitation. In the book: Chemical Reaction in Non- equilibrium Plasma, Moscow, NAUKA, 1983, p.3-29. /In Russian/.
8. V.D.Rusanov, V.K.Givotov, A.A.Fridman. The Plasmachemical processes in Microwave Discharge. In the book: Plasma Chemistry, v.11, Moscow, ATOMIZDAT, 1984, p.200-241.

/In Russian/.

9. A.A.Fridman, V.A.Legasov, I.G.Belousov, V.D.Rusanov. New Plasmachemical Methods of Energy-carriers Production. In the book: Atomic and Hydrogen Power Engineering and Technology, Moscow, ATOMIZDAT, 1988, p.100-115. /In Russian/.
10. I.Kirillov, A.Fridman. The Mechano- Chemical Theory of Breakaway Zr Oxidation. In the book: Hydrogen Behavior and Mitigation in Water-cooled Nuclear Power Reactor. Ed. by Della Loggia, CEC, Brussels, 1992, pg.173-194, ibid. 297-305.
11. B.Potapkin, M.Deminsky, A.Fridman, V.Rusanov. The Effect of Clusters and Heterogeneous Reactions on Non-equilibrium Plasma Flue Gas Cleaning. In the book: Non-Thermal Plasma Techniques for Pollution Control. NATO ASI Series G, vol.34A, pg.91-107, ibid. vol.34B, 1993, pg.71-77.
12. A.Fridman, V.Rusanov. Theoretical Basis of Non-equilibrium Near Atmospheric Pressure Plasma Chemistry. Pure and Applied Chemistry, vol.66, 1994, pg.1267-1274.
13. O.Mutaf-Yardimci, A..Fridman, L.Kennedy in: "Heat and Mass Transfer Under Plasma Conditions", Ed. by P.Fauchais, Annals of the New York Academy of Sciences, vol.891, 2000.
14. Y.I.Cho, A.Fridman, S.H.Lee, W.T.Kim "Physical Water Treatment for Fouling Prevention in Heat Exchangers", published in Vol. 38 (2004), pg. 1-73 in "Advances in Heat Transfer", Academic Press, N.Y.
15. A. Fridman, A. Chirokov and A. Gutsol, Topical Review "Non-thermal atmospheric pressure discharges", J. Phys. D: Applied Physics, Vol. 38, Issue 2 (21 January 2005) R1-R24.

MAJOR ARTICLES IN INTERNATIONAL JOURNALS:

1. V.K.Givotov, M.F.Krotov, V.D.Rusanov, A.A.Fridman. Plasmachemical Methods of Hydrogen Production. International Journ. of Hydrogen Energy, Pergamon Press Ltd., v.6, 1981, p.441-449.
2. R.Asisov, A.Vakar, V.Givotov, M.Krotov, E.Krashennnikov, V.Rusanov, A.Fridman. Plasmachemical Methods of Energy Carriers Production. International Journ. of Hydrogen Energy, Pergamon Press Ltd., v.10, 1985, p.475-477.
3. G.Baronov, D.Bronnikov, A.Fridman, B.Potapkin, V.Rusanov. The Effect of Superequilibrium Population in the Excited States of CO Degenerate Vibrational Modes under Vibrational-Translational Non-equilibrium. Journal of Physics, B: Atom.,Mol.,Opt.Phys., v.22, 1989, p.2903-2909.

4. A.Z.Bagautdinov, V.K.Givotov, A.A.Fridman e.a. Hydrogen Sulfide Dissociation in High Pressure Microwave Discharge with Power up to 1 MW. High Temperature Chemical Processes, Ed.by J.Amouroux, France, v.2, p.47-52, 1993.
5. E.Baranchicov, G.Belenki, V.Denisenko, M.Deminsky, V.Rusanov, B.Potapkin, A.Fridman. Plasma Catalysis of SO₂ Oxidation in an Air Stream by a Relativistic Electron Beam and Corona Discharge. Int.J.of Radiat. Physics and Chemistry, v.40, p.287-294, 1992.
6. A.Fridman, A.Petrusev, J.Chapelle, J.-M.Cormier, A.Czernichowski, H.Lesueur, J.Stevelfelt. Modele Physique de l'Arc Glissant, Journal de Physique, III, France, v.4, 1994, pg.1449- 1465. /In French/.
7. I.Adamovich, J.W.Rich, S.Macheret, A.Fridman. Kinetics of Diatomic Molecule Dissociation after a Shock Wave Front. IAAA, 1994.
8. J.W.Rich, S.Macheret, A.Fridman. The Model of Vibrationally Excited Molecule Dissociation, J.Chem.Phys., 1994.
9. A.Czernichowski, A.Fridman, J.Chapelle. Gliding Arc - Non-equilibrium, High Power, Atmospheric Pressure Discharge. 1. Theory. Journal of Applied Physics, 1995.
10. A.Czernichowski, A.Fridman, M.Simek, H.Nassar, K.Musiol, A.Ranaivosoloarimanana, E.Pawelec, L.Dittrichova. Gliding Arc - Non-equilibrium, High Power, Atmospheric Pressure Discharge. 1. Experiments. Journal of Applied Physics, 1995.
11. A.Fridman, L.Boufendi, T.Hbid, B.Potapkin, A.Bouchoule. Dusty Plasma Formation: Physics and Critical Phenomena. Theoretical Approach. Journal of Applied Physics, 1995.
12. B.Potapkin, M.Deminsky, A.Fridman. The Effect of Clusters and Heterogeneous Reactions on Non-Equilibrium Plasma Flue Gas Cleaning. Radiat.Phys.Chem., vol.45, #6, pp.1081-1088, 1995.
13. E.I.Baranchikov, G.S.Belenky, M.A.Deminsky, A.A.Fridman e.a. Radiat.Phys.Chem., vol.45, #6, pp.1081-1088, 1995.
14. A.Fridman, J.Chapelle, J.-M.Cormier, A.Czernichowski, "Modele Physique de l'Arc Glissant", Journal de Physique, III, France, v.4, 1994, pp. 1449-1465.
15. E.I.Baranchikov, A.A.Fridman ea., "Investigation of SO₂ Oxidation in Humid Air Stream by High Current Density Pulsed Electron Beam", Radiat.Phys.Chem., vol.45, #6, pp.1081-1088, 1995.

16. A.A.Fridman, A.Bouchoule “Dusty Plasma Formation”,. J. Appl. Phys., vol.79, #3, pp.1303- 1314, 1996.
17. L.A.Kennedy, A.Fridman, A.V.Saveliev, “Superadiabatic Combustion in Porous Media: Wave Propagation, Instabilities, New Type of Chemical Reactor”, Journal of Fluid Mechanics Research, 1996, vol.22, #2, pg.1-27.
18. O.Mutaf-Yardimci, A.Saveliev, A.Fridman, L.A.Kennedy “Employing Plasma as Catalyst in Hydrogen Production”, Int. J. of Hydrogen Energy, vol.23, 1998.
19. D.Neff, A.Fridman, R.Viscanta, D.Rue, H.Abbassi “High-Luminosity Low NOx Oxy-Natural Gas Burner for High Temperature Furnaces”, J. of Glass Problems, pg.13, 1999.
20. A.Fridman, S.Nester, L.A.Kennedy, A.Saveliev, O.Mutaf-Yardimci “Gliding Arc Discharge”, Progress in Energy and Combustion Science, vol.25, pp.211-231, 1999.
21. O.Mutaf-Yardimci, A.Saveliev, A.Fridman, L.A.Kennedy, “Thermal and Non-Thermal Regimes of Gliding Arc Discharge in Air Flow”, J. of Applied Physics, vol.87, pg.1632-1641, 2000.
22. A.Fridman, J.Harkness “The Technical and Economic Feasibility of Using Low Temperature Plasmas to Treat Gaseous Emissions from Pulp Mills and Wood Product Plants”, NCASI Technical Journal, #795, pg 1-50, 2000.
23. S.Zelepouga, A.Saveliev, L.Kennedy, A.Fridman “Relative Effect of Acetylene and PAHs Addition on Soot Formation in Laminar Diffusion Flames of Methane with Oxygen and Oxygen Enriched Air”, Combustion and Flames, 2000.
24. P.Mosiewicz, P.Porshnev, S.Nester, L.Kennedy, A.Fridman, J.Rabovitzer, D.Cygan “The low temperature Combustion in Low NOx Burner ”, Combustion Science and Technology, vol.160, pg.1-21, 2000.
25. A.Beltrame, P.Porshnev, W.Merchan-Merchan, A.Saveliev, A.Fridman, L.Kennedy, O.Petrova, S.Zhdanok, F.Amouri, O.Charon “Soot and NOx Formation in Methane-Oxygen Enriched Diffusion Flame”, Combustion and Flames, 2001.
26. S.Conti, P.I.Porshnev, A.Fridman, L.A.Kennedy, J.M.Grace, K.D.Sieber, D.R.Freeman, K.S.Robinson, “Experimental and Numerical Investigation of a Capacitively Coupled Low Radio Frequency Nitrogen Plasma”, Experimental Thermal and Fluid Science, vol.24, pg.79-91, 2001.

27. J.P.Bingue, A.V.Saveliev, A.A.Fridman, L.A.Kennedy, "NO_x and CO Emissions of Lean and Ultra-Lean Filtration Combustion of Methane/Air Mixture in an Inert Porous Media", *Environmental Combustion Technology*, pp.1-14, 2001.
28. I.Kuznetsova, N.Kalashnikov, A.Gutsol, A.Fridman, L.Kennedy "Effect of Overshooting in the Transitional Regimes of the Low Current Gliding Arc Discharge", *Journal of Applied Physics*, vol.92, #8, pg. 4231-4237, 2002.
29. W.Merchan-Merchan, A.Saveliev, L.Kennedy, A.Fridman "Formation of Carbon Nano-Tubes in Counter-Flow Oxy-Methane Diffusion Flames Without Catalysts", *Chemical Physics Letters*, vol.354, pg.20-24, 2002.
30. J.P.Bingue, A.Saveliev, A.Fridman, L.Kennedy "NO_x and CO emissions of Lean and Ultra-Lean Filtration Combustion of Methane/Air Mixtures in an Inert Porous Media", *Clean Air*, vol.3, pg.199-210, 2002.
31. M.Sobacchi, A.Saveliev, A.Fridman, A.Gutsol, L.Kennedy "Experimental Assessment of Pulsed Corona Discharge for Treatment of VOC emissions", *Plasma Chemistry and Plasma Processing*, vol.23, #2, pg.347-370, 2003.
32. A.Kouprine, F.Gitzhofer, M.Boulos, A.Fridman "Polymerlike C:H Thin Film Coating of Nano-Powders in a Capacitively-Coupled RF-discharge", *Plasma Chemistry and Plasma Processing*, vol.24, No.2, June 2004, pg.189-216.
33. Chirokov A., Gutsol A., Fridman A., Sieber K. D., Grace J. M., and Robinson K. S., "Analysis of two-dimensional microdischarge distribution in dielectric-barrier discharges" *Plasma Sources Science and Technology*, Vol. 13, 2004, p. 623-635
34. C. S. Kalra, A. Gutsol, A. Fridman, "Gliding arc discharge as a source of intermediate plasma for methane partial oxidation", *IEEE Transactions on Plasma Science* V. 33, No. 1, p. 32-41 (2005).
35. Fridman G., Li M., Lelkes P.I., Friedman G., Fridman A., Gutsol A. "Non-Thermal Plasma Bio-Active Liquid Micro and Nano-Xerography", *IEEE Transactions on Plasma Science*, V. 33, No. 3, pp. 1061-1065 (2005).
36. Chirokov, A. Gutsol, and A. Fridman "Atmospheric pressure plasma of dielectric barrier discharges", *Pure and Applied Chemistry*, Vol. 77, No. 2 (2005), pp. 487-495.
37. Fridman, A. Chirokov and A. Gutsol, Topical Review "Non-thermal atmospheric pressure discharges", *J. Phys. D: Applied Physics*, Vol. 38, Issue 2 (21 January 2005) R1-R24.
38. Chirokov A., Gutsol A., Fridman A., Sieber K. D., Grace J. M., and Robinson K. S., "Self-organization of microdischarges in dielectric barrier discharge plasma" *IEEE Transactions on Plasma Science*, April, 2005, V. 33, No. 2, P. 300-301.

39. S. Kalra, Y. I. Cho, A. Gutsol, A. Fridman, T. S. Rufael, "Gliding arc in tornado using a reverse vortex flow". *Review of Scientific Instruments*, **76**, 025110 (2005) (7 pages).
40. Staak, D., Farouk, B., Gutsol, A., Fridman, A., "Characterization of a dc atmospheric pressure normal glow discharge", *Plasma Sources Science and Technology*, V. 14, No. 4, pp. 700-711 (2005).
41. Ombrello, T., Qin, X., Ju, Y., Gutsol, A., Fridman, A., Carter, C., "Combustion Enhancement via Stabilized Piecewise Nonequilibrium Gliding Arc Plasma Discharge", *AIAA Journal* 2006, 0001-1452 vol.44 no.1, pg. 142-150.
42. Fridman, A. Gutsol, A. Dolgopolsky, E. Stessel, "CO₂ -free Energy and Hydrogen Production from Hydrocarbons", *Energy & Fuels*, 2006, Vol. 20, pp. 1242-1249.
43. Chirokov A., Gutsol A., Fridman A., Sieber K. D., Grace J. M., and Robinson K. S., "A Study of Two-Dimensional Microdischarge Pattern Formation in Dielectric Barrier Discharge", *Plasma Chemistry and Plasma Processing*, Vol. 26, 2006, pp. 127-135.
44. Gregory Fridman, Marie Peddinghaus, Halim Ayan, Alexander Fridman, Manjula Balasubramanian, Alexander Gutsol, Ari Brooks, Gary Friedman, "Blood Coagulation and Living Tissue Sterilization by Floating-Electrode Dielectric Barrier Discharge in Air" , *Plasma Chemistry and Plasma Processing*, Vol. 26, pg. 425-442, 2006.
45. Farouk T., Farouk B., Staack D., Gutsol A., and Fridman, A., "Simulation of dc atmospheric pressure argon micro-glow discharge", *Plasma Sources Science and Technology*, vol. 15, pp. 676-688 (2006).
46. Boateng, A. A., Hicks, K. B., Flores, R. A., Fridman, A., Gutsol, A., "Pyrolysis of hull-enriched byproducts from the scarification of hulled barley (*Hordeum vulgare* L.)", *Journal of Analytical and Applied Pyrolysis*, 2006, vol. 75, pg. 55.

MAIN ARTICLES IN RUSSIAN JOURNALS (TRANSLATED TO ENGLISH):

The English titles of the translated russian journals are:
"Journal Tehnicheskoy Fiziki" - Sov. Phys.- Technical Physics.

"Pisma JTF" - Sov. Phys.- Technical Physics Letters.

"Doklady RAN" - Sov. Phys.- Doklady, (Rep. of Academy of Science).

"Himija Vysokih Energij" - High Energy Chem., Plenum Publ. Corp.

"Teplofizika Vysokih Temperatour" - High Temperature Thermophys.

"Himicheskaja fizika" - Sov. Journ. of Chemical Physics, Gordon & Breach Science Publishers.

"Teoreticheskaja i Experimentalnaja Himija" - Theoretical and Experimental chemistry, Plenum Publishing Corporation.

If the pages of translated articles correspond to Russian original we will mark them by "*".

1. G.V.Karachevtsev, A.A.Fridman. Calculation of Electron Concentration for Supersmall Particle Photo-ionization. Sov.Phys.-Tech.Phys., 1975, v.19, p.1471-1475.

2. G.V.Karachevtsev, A.A.Fridman. The Dusty Gas Breakdown. Sov. Phys.-Tech.Phys., 1976, v.21, p.1386-1392.

3. V.D.Rusanov, A.A.Fridman. Vibrationally Excited Nitrogen Molecule Reactions in Non-equilibrium Plasma. Sov.Phys.-Doklady, 1976, v.21, p.739-742.

4. G.V.Karachevtsev, A.A.Fridman. Electric Conductivity of Thermoionized Dusty Plasma. High Temp.Thermophys., 1977, v.15, p.922-923 .

5. V.D.Rusanov, A.A.Fridman, G.V.Sholin. Non-Boltzman Population of Vibrationally Excited States in Non-equilibrium Plasmachemical Process of Carbon Reduction. Sov.Phys.-Doklady, 1977, v.22, p.757-760.

6. V.D.Rusanov, A.A.Fridman. CO -Decomposition in High Pressure Nonequilibrium Plasma. Sov.Phys.-Tech.Phys.Letters, 1978, v.4, p.11-14.

7. V.D.Rusanov, A.A.Fridman. The Big Molecules Destruction in Water by Plasma Flow. Sov.Journ. of Phys.Chem.,1978,v.52, p.92-96 .

8. V.A.Legasov, V.K.Givotov, A.A.Fridman e.a. Non-equilibrium Plasmachemical Process of CO -decomposition in RF- and Microwave Discharges. Sov.Phys.-Doklady, 1978, v.23, p.44-47.

9. S.O.Macheret, V.D.Rusanov, A.A.Fridman. Nitrogen Oxides Synthesis in Non-equilibrium Plasma. Sov.Phys.-Tech.Phys.Letters, 1978, v.4, p.140-145.

10. V.A.Legasov, A.K.Vakar, V.P.Denisenko, V.D.Rusanov, A.A.Fridman. Plasma Radiolysis of CO by High Current Relativistic Electron Beam. *Sov.Phys.-Doklady*, 1978, v.23, p.841-844.
11. V.D.Rusanov, A.A.Fridman, G.V.Sholin. CO -Dissociation in Non- equilibrium Plasma. *Sov.Phys.-Tech.Phys.*, 1979, v.24, p.1195-1202.
12. V.D.Rusanov, A.A.Fridman, G.V.Sholin. The Diffusion Theory of Population of Diatomic Molecule Vibrationally Excited States in Non-equilibrium Plasma. *Sov.Phys.-Tech.Phys.*, 1979, v.24, 318-326.
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