



Second International Symposium on Nanotechnology, Energy and Space

August 3-5, 2011

Chernogolovka, Moscow Region, Russia

WEDNESDAY MORNING August 3, 2011

7:30 Registration and Continental Breakfast/Presentation Uploads

Welcome

8:30 Greeting to participants of the Symposium

Alexander Aseev, *Academician, Vice-president of the Russian Academy of Sciences*

Greeting to participants of the Symposium

Sergey Krikalev, *Chief, State Organization "Gagarin Research & Test Cosmonaut Training Center"*
Hero of Soviet Union, Hero of the Russian Federation, Pilot-cosmonaut of USSR

Opening Remarks

Alex Ignatiev, Oleg Pchelyakov, Anatoly Vyatkin

Session 1

SPACE AND ENERGY (Chair: Prof. Alex Freundlich)

9:00 *Invited* - Development of Microwave Power Transmission for the Solar Power Satellite

Nobuyuki Kaya

9:30 *Invited* - Wireless Power Transmission via Laser from Space - Enabling Large Scale Terrestrial Solar Power Infrastructures?

Leopold Summerer, *ESA Advanced Concepts Team*

10:00 BREAK

Session 2

NANOTECHNOLOGY IMPACTS ON THE UTILIZATION OF SPACE (Chair: Dr. Alex Ignatiev)

10:30 *Invited* - Development of Emerging III-V Bismide Semiconductors for Photonics and Optoelectronics

Mohamed Henini, *School of Applied Physics, University of Nottingham, United Kingdom*

11:00 *Invited* - Quantum paths to high efficiency space photovoltaics

Alex Freundlich, *Center for Advanced Materials, University of Houston*

11:30 *Invited* - Nanotechnology in space ultra vacuum conditions: modern statement and prospects

Oleg Pchelyakov, *at al., Rzhzanov Institute of Semiconductor Physics, Siberian Branch RAS*

12:00 LUNCH

WEDNESDAY AFTERNOON August 3, 2011

Session 3

NANOTECHNOLOGY FOR HIGH EFFICIENCY SOLAR CELLS (Chair: Leopold Summerer)

- 1:30 *Invited* - Novel Designs of Efficient Solar Cells
Samson Milshtein, *University of Massachusetts*
- 2:00 *Invited* - Lightweight Dye Sensitized Solar Cells with Doped Carbon Nanotube Charge Collectors
Zharkynay Kuanyshbekova, Joe Velten, Julya Bykova, Darkhan Ybyraiymkul, Dauletkhan Smagulov, Anvar Zakhidov, *The Alan G. MacDiarmid NanoTech Institute, University of Texas at Dallas*;
Kanysh I. Satbaev, *Kazakh National Technical University*
- 2:30 *Invited* - InGaN Nano-Columns for high Efficient Photo-Voltaic Cell
Moshe Einav, Mosaic Crystals Ltd, Israel;
M.A. Revienko, *Rzhanov Institute of Semiconductor Physics, SB RAS*
- 3:00 BREAK

Session 4

LATE NEWS PAPERS (Chair: Dr. Anvar Zakhidov)

- 3:15 *Invited* - A View on Prospects of Photovoltaics in Kazakhstan
N.S. Tokmoldin, N.S. Bekturganov and S.Zh. Tokmoldin
Institute of Physics and Technology, Kazakhstan National R & D Holding «Parasat»
- 3:45 DNA based electronic nanobiosensors and nanobiochips
V.D. Lakhno, *Institute of Mathematical Problems of Biology RAS*
- 4:00 *Invited* - Многофункциональные нанопокрyтия для космических аппаратов: атомно-силовая микроскопия
Е.П. Березицкая, А.С. Паршин, Г.А. Александрова и др.,
Сибирский государственный аэрокосмический университет имени М. Ф. Решетнева
- 4:30 Possible Prospects of Development of a Problem of Physics, Chemistry and Technology of Antimatter
Е.Р. Prokorev, *Institute for theoretical and experimental physics*
- 4:45 Особенности формирования катализатора на кремниевых электродах.
А.В. Тетерский, *Институт проблем технологии микроэлектроники и особо чистых материалов РАН*
- 7:00 CONFERENCE DINNER
50th Anniversary of the space flight of Yuri Gagarin Commemoration

THURSDAY MORNING August 4, 2011

8:00 Continental Breakfast/Presentation Uploads

Session 5

NANOSTRUCTURED SOLAR CELLS I (Chair: Dr. Alexander Nikiforov)

9:00 *Invited* - Ultra wideband multiwall carbon nanotube sheet polarizers for space applications

Yakov Lesnichiy, *NanoTech Institute, University of Texas at Dallas*

9:30 Технология изготовления наноструктурированных фотоэлектрических элементов

А.В. Проказников, *Ярославский филиал Физико-технологического института РАН, Ярославль*

9:45 Nanoparticles Formation in SiO₂/Si structure by Zn⁺ Ion Implantation with Thermal Annealing

V.S. Kulikauskas, *Skobel'tsyn, Lomonosov Moscow State University*

10:00 BREAK

Session 6

NANOSTRUCTURED SOLAR CELLS II (Chair: Prof. Ivan Ivonin)

10:15 *Invited* - Carbon Nanotube Charge Collectors in Hybrid Tandem Solar Cells for Space

Anvar Zakhidov, *The Alan G. MacDiarmid NanoTech Institute, University of Texas at Dallas*

10:45 *Invited* -Photovoltaic cell with nano-porous silicon produced by plasma immersion ion implantation

A.V. Miakonkikh, *Institute of Physics and Technology RAS*

Session 7

ENERGY STORAGE WITH NANOSTRUCTURES (Chair: Prof. Oleg Pchelyakov)

11:30 *Invited* - Nanostructures for Hydrogen Energy Storage

Alex Ignatiev, *Center for Advanced Materials, University of Houston*

12:00 LUNCH

THURSDAY AFTERNOON August 4, 2011

Session 8

NANOTECHNOLOGY AND ADVANCED MATERIALS (Chair: Dr. Mohamed Henini)

- 1:30 *Invited* - Seeded Crystalline Graphene Synthesis by Chemical Vapor Deposition
Qingkai Yu
- 2:00 *Invited* - Deprocessing of modern IC using grazing incident ion beams
A.F. Vyatkin, *Institute of Microelectronics Technologies RAS*
- 2:30 Плазмохимические безмасочные процессы получения «черного кремния» для солнечной энергетики
И.И. Амиров, *Ярославский филиал, Физико-технологический институт РАН*
- 2:45 Tin Induced Crystallization Process in the Amorphous Silicon Films
V. Voitovych, *Institute of Physics, National Academy of Sciences of Ukraine;*
Laskarev Institute of Semiconductor Physics, National Academy of Sciences of Ukraine
- 3:00 Формирование глубоких тонких слоев $\text{Si}_x\text{O}_{1-x}$, $\text{Si}_x\text{N}_{1-x}$, $\text{Si}_x\text{Me}_{1-x}$ в кремнии
А.В.Францкевич, *БНТУ, Республика Беларусь*
- 3:15 BREAK

Session 9

PROGRESS IN GeSi AND III-V QUANTUM DOT SOLAR CELLS (Chair: Prof. A.F. Vyatkin)

- 3:30 *Invited* - Photodetectors on the basis of Ge/Si nanoheterostructures
I.V. Ivonin, *Tomsk State University*
- 4:00 Ge/Si(001) Heterostructures with Dense Arrays of Ge Quantum Dots: Low-Temperature Formation, Characterization by High Resolution STM and TEM, and Exploration of Photo-EMF Spectra
V.A. Yuryev, *Applied Thermography Department, A. M. Prokhorov General Physics Institute RAS*
- 4:15 The structures with germanium quantum dots for photovoltaics
A.I. Nikiforov, *Rzhanov Institute of Semiconductor Physics SB RAS*
- 4:30 Nanostructures formation with a self-assembled mask
L.V. Sokolov, *Rzhanov Institute of Semiconductor Physics SB RAS; Novosibirsk State University*
- 4:45 End of the session
- 5:00 – 6:30 **Wine and Cheese RUMP Session** - Group Discussion
Workshop on collaborative opportunities in the overlapping disciplines of nanotechnology, energy, and space
(Alex Ignatiev, A.Vyatkin, O.Pchelyakov)

FRIDAY August 5, 2011

8:00 Continental Breakfast/Presentation Uploads

Session 10

ADVANCED METROLOGY OF NANOSTRUCTURES (Chair: Pr. Serekbol Tokmoldin)

9:00 *Invited* - Real-time metrology of epitaxial quantum dots by reflection high energy electron diffraction
Alex Freundlich, *Center for Advanced Materials, University of Houston*

9:30 *Invited* - Computer-aided minority carrier lifetime meter in silicon by non-contact microwave method
V.M. Vladimirov, *Krasnoyarsk Scientific Center of SB RAS*

10:00 Контроль строения слоистых наноструктур методом спектроскопии сечения неупругого рассеяния отраженных электронов
А.С. Паршин, *Сибирский государственный аэрокосмический университет им. Академика М.Ф. Решетнева, Красноярск*

10:15 The system for molecular beam epitaxy in space and its terrestrial stand-simulator
D.N. Pridachin, *Rzhanov Institute of Semiconductor Physics SB RAS*

10:30 Определение электрофизических параметров полупроводниковых слитков, эпитаксиальных и гетероэпитаксиальных структур методом поверхностной фотоЭДС
В.Н. Подшивалов, *ЗАО Аналитические методы 21, Москва*

10:45 BREAK

Session 11

NANO-FUEL CELL CONCEPTS (Chair: Dr. Alexander Ivanov)

11:00 *Invited* - Nanostructured Thin Films Solid Oxide Fuel Cells
Alex Ignatiev, *Center for Advanced Materials, University of Houston*

11:30 Gradient porous Si structure: influence of etching time on the pores dynamics and ordering
A.Y. Nikulin, *School of Physics, ARC Centre of Excellence for Coherent X-ray Science, Monash University*

11:45 *Invited* - Пористые кремниевые мембраны и миниатюризация микро топливных элементов
В.В. Старков, *Институт проблем технологии микроэлектроники и особочистых материалов РАН*

12:15 LUNCH – Closing Remarks (Alex Ignatiev, Anatoly Vyatkin and Oleg Pchelyakov)

13:00 EXCURSION TO THE YU. A. GAGARIN COSMONAUT TRAINING CENTER