SESSION 1 [9:15 – 10:35]

01. 01.1 NAME Valeria Frolova
01.2 INSTITUTE Institute of High Current Electronics, SB RAS
01.3 LAB Laboratory of Plasma Sources
01.4 TITLE Generation of Beams of Multiply Charged Metal Ions in a Spark-Phase High-Current Pulsed Vacuum-Arc Discharge in a Strong Magnetic Field
01.5 ABSTRACT High-charge metal-ion beams find many applications in fundamental nuclear and atomic physics as well as in applied science such as ion-beam surface modification. Metal ions produced by vacuum arc are often multiply charged, typically involving charge states from 1+ to 3+, and in some cases 4+ and 5+. A number of different techniques have been used for increasing the ion charge states of vacuum arc in ion sources. These approaches include the use of a strong magnetic field in the cathode region, application of additional short-time arc current pulses or even a "train of spikes" and additional ionization by means of an electron beam injected into the arc plasma. For all of these approaches, the mean ion charge states can be increased but by no more than a factor of about 2, i.e., ion beams containing ion charge states up to 7+. Higher ion charge states up to 10+ have been achieved by two different methods: heating of plasma confined in magnetic trap by a high-power gyrotron and generation […] in high current vacuum arcs when the power dissipated in the arc gap was maintained at ~10 MW for a few microseconds. For technological applications, the second method, realized via a simple technique, seems more preferable. Here, a combination of strong magnetic field in the cathode area and a short high current pulse of the arc for high-charge metal-ion beams are proposed. This can allow reaching higher charged states of metal ions than was done before. The design of a new ion source and some preliminary results on high-charge metal-ion beams generation are discussed.
01.6 CONT.INFO frolova_valeria_90@mail.ru
01.7 KEYWORDS ion-beam / ion-source / vacuum arc discharge

02. 02.1 NAME Alexandr Grenadyorov
02.2 INSTITUTE Institute of High Current Electronics, SB RAS
02.3 LAB Laboratory of Applied Electronics
02.4 TITLE Deposition of Silicon-carbon Coatings in Plasma Based Nonself-sustained Arc Discharge with Heated Cathode
02.5 ABSTRACT Silicon-carbon coatings on silicon substrates were deposited in plasma based nonself-sustained arc discharge with heated cathode by plasma polymerization of silicon organic agent such as polyphenyl methylsiloxane (PPhMS). Silicon-carbon coatings were deposited at PPhMS flow rate of 0.012 ml/min, argon pressure of 0-0.1 Pa, discharge current of 5-8 A, discharge voltage of 130-150 V, and filament current of 68 A. Surface morphology, hardness and elastic modulus of silicon-carbon films were investigated after the deposition. The film surface is very smooth with root-mean-square roughness of 0.579 nm. Maximum hardness of coatings was 11 GPa, and maximum elastic modulus was 142 GPa.
02.6 CONT.INFO 1711Sasha@mail.ru
02.7 KEYWORDS silicon-carbon films / diamond-like carbon / polyphenyl methylsiloxane

03. 03.1 NAME Aleksey Lavrinovich
03.2 INSTITUTE Institute of High Current Electronics, SB RAS

	03.3	LAB	High Energy Density Department
	03.4	TITLE	Toroidal-Core Pulse Transformer with 1,2 MV Output Voltage
	03.5	ABSTRACT	A rather compact pulse transformer with a closed toroidal core wound with a transformer steel strip 50 μm thick and a secondary transformer winding was manufactured for charging a forming line up to 1.2 MV in 600-700 ns. The pulse transformer is a metal container of overall diameter 930 mm and length 626 mm. The transformer was tested at a voltage of 1.1-1.2 MV with no breakdown in more than 100 shots.
	03.6	CONT.INFO	lavrinovich86@yandex.ru
	03.7	KEYWORDS	pulse transformer / line transformer / forming line
04.	04.1	NAME	Viktor Panarin
	04.2	INSTITUTE	Institute of High Current Electronics, SB RAS
	04.3	LAB	Laboratory of Optical Radiation
	04.4	TITLE	Acoustic Characteristics of XeCl-Excilamp
	04.5	ABSTRACT	N/A
	04.6	CONT.INFO	N/A
	04.7	KEYWORDS	N/A
05.	05.1	NAME	Irina Pukhova
	05.2	INSTITUTE	Institute of High Current Electronics, SB RAS
	05.3	LAB	Laboratory of Plasma Sources
	05.4	TITLE	Modification of Silicon Rubber Surface Resistance by Metal Ion Implantation
	05.5	ABSTRACT	N/A
	05.6	CONT.INFO	N/A
	05.7	KEYWORDS	silicon rubber / polymers / surface resistance / conductivity / metal ion implantation
06.	06.1	NAME	Natalia Semeniuk
	06.2	INSTITUTE	Institute of High Current Electronics, SB RAS
	06.3	LAB	Laboratory of Theoretical Physics
	06.4	TITLE	Hybrid Model of Runaway Electrons Generation Process in Nanosecond High Pressure Gas Discharge
	06.5	ABSTRACT	N/A
	06.6	CONT.INFO	N/A
	06.7	KEYWORDS	runaway electrons / nanosecond high pressure gas discharge / numerical simulation

SESSION 2 [10:45 – 12:30]

07.	07.1	NAME	Ekaterina Korotkova
	07.2	INSTITUTE	Institute of Monitoring of Climatic and Ecological Systems, SB RAS
	07.3	LAB	N/A
	07.4	TITLE	Comparative Study of Total Ozone and UV Radiation Observations for the Circumpolar Boreal Forest Growth
	07.5	ABSTRACT	N/A
	07.6	CONT.INFO	N/A
	07.7	KEYWORDS	N/A
08.	08.1	NAME	Kseniya Kuryanovich
	08.2	INSTITUTE	V.E. Zuev Institute of Atmospheric Optics, SB RAS
	08.3	LAB	Group of Atmospheric Acoustics

	08.4	TITLE	A Statistical Model of Cloudiness Image Texture based on MODIS Data
	08.5	ABSTRACT	The results of statistical model formation for texture images of 25 types of clouds (meteorological standard) based on MODIS satellite data with a spatial resolution of 250 m are given. The technique of distribution selection and selection parameters describing the texture features value fluctuations for various cloud types are described. A number of approaches to describing satellite images textures are presented. The statistical model formation of cloud texture images and cloud types classification using various algorithms are discussed.
	08.6	CONT.INFO	ksuyain@mail.ru
	08.7	KEYWORDS	cloudiness / texture features / statistical model / classification / satellite data
09.	09.1	NAME	Dmitry Korneev
	09.2	INSTITUTE	Institute of Petroleum Chemistry, SB RAS
	09.3	LAB	Laboratory of Hydrocarbons and High-Molecular Petroleum Compounds
	09.4	TITLE	Conversion Regularities of Oil High-Molecular Compounds in Thermal Processes
	09.5	ABSTRACT	N/A
	09.6	CONT.INFO	mitay2580@mail.ru
	09.7	KEYWORDS	heavy crude oil / resins / asphaltenes / thermolysis
10.	10.1	NAME	Olesya Sedelnikova
	10.2	INSTITUTE	Institute of Petroleum Chemistry, SB RAS
	10.3	LAB	Laboratory of Catalytic Processing of Light Hydrocarbons
	10.4	TITLE	Influence of Ultrasonic Pretreatment of Mo/ZSM-5 Catalyst on Their Physical – Chemical Properties and Catalytic Activity in Methane Dehydroaromatization Process
	10.5	ABSTRACT	In this paper, an influence of ultrasonic treatment (US) of Mo/ZSM-5 catalysts on their physical- chemical properties and catalytic activity in the process of methane dehydroaromatization has been investigated. The sapmles of catalyst were preparated by means mechanical mixing of zeolite with structure type ZSM-5 and 4% Mo powders. In order to understand a nature of ultrasonic effect, a treatment has been conducted in the various media (water, methanol, acetonitril) and periods (1 and 3 minutes). The reaction of methane dehydroaromatization was carried out using quartz flowing type reactor at 750 °C, 1000 scc/g/h and overpressure. The characterization of catalyst sapmles has been determined by XRD, TPDA, IR-spectra techniques.
	10.6	CONT.INFO	olesya.sedelnikova@mail.ru
	10.7	KEYWORDS	heavy crude oil / resins / asphaltenes / thermolysis
11.	11.1	NAME	Anastasiya Shcherbakova
	11.2	INSTITUTE	Institute of Petroleum Chemistry, SB RAS
	11.3	LAB	Colloidal Chemistry of Oil
	11.4	TITLE	Microbial Enhanced Oil Recovery
	11.5	ABSTRACT	Physicochemical methods for enhancing oil recovery from oil fields that are developed using thermal steam treatment are considered. The results of pilot testing of processes based on these methods carried out at Usinskoye oil field are analysed. Particular interest is focused on the processes that make use of surfactant blends and oil-displacing gel-forming systems.
	11.6	CONT.INFO	ms.anastasiya.shcherbakova@mail.ru
	11.7	KEYWORDS	high-viscosity oil / oil recovery / oil-displacing system / viscosity / oil displacement
12.	12.1	NAME	Aleksandra Volynkina
	12.2	INSTITUTE	Institute of Petroleum Chemistry, SB RAS

	12.3	LAB	Catalytic Processing of Light Hydrocarbons
	12.4	TITLE	Aromatization Propane on Ga-Containing Zeolite Catalyst
	12.5	ABSTRACT	N/A
	12.6	CONT.INFO	a.volynkina@inbox.ru
	12.7	KEYWORDS	ga-containing / catalyst / acid sites / zeolite

SESSION 3 [13:00 – 14:30]

13.	13.1	NAME	Alexandr Eliseev
	13.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	13.3	LAB	Laboratory of Physics of Surface Hardening
	13.4	TITLE	Microstructure of Fixed Butt Joints in 2024T3 Aluminum Alloy Formed by Friction Stir Welding
	13.5	ABSTRACT	In this work the microstructure of AA2024T3 FSW-joint was examined. Second phase particles were sorted by size and form. Weak correlation between volume fraction of particles and microhardness was found.
	13.6	CONT.INFO	rmsd13@mail.ru
	13.7	KEYWORDS	friction stir welding / heat hardenable aluminum alloy / microstructure / second phase / microhardness
14.	14.1	NAME	Tatiana Kalashnikova
	14.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	14.3	LAB	Laboratory of Physics of Surface Hardening
	14.4	TITLE	Diffusion-Controlled Wear of Steel Tools used in Friction Stir Welding with Aluminum Alloys
	14.5	ABSTRACT	Experimental results characterising the mechanism of friction stir welding tool wear used with amg5m aluminum alloy have been shown. The adhesive interaction between aluminum alloy and steel tool resulted in reaction-diffusion between these metals with final formation of intermetallic Al/Fe compound pikes inside the steel tool body. It was shown that these intermetallics are very hard and brittle, it's in them where the cracking initiates and wear particles are being pulled out of the tool metal.
	14.6	CONT.INFO	gelombang@mail.ru
	14.7	KEYWORDS	friction stir welding / tool / intermetallics / wear particles
15.	15.1	NAME	Ekaterina Komarova
	15.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	15.3	LAB	Laboratory of Physics of Nanostructured Biocomposites
	15.4	TITLE	Investigation of Physical and Chemical Properties of Calcium Phosphate Coatings on Nanostructured Titanium Surfaces
	15.5	ABSTRACT	The influence of micro arc oxidation parameters such as electrical voltage and process duration on physical and chemical characteristics of calcium phosphate (cap) coatings on nanostructured titanium was investigated. It was shown that by increasing oxidation voltage from 150 to 300v and process duration from 5 to 15 min the thickness and surface roughness increase linearly. The coating contact angles with liquids decrease linearly and the free surface energy of the coatings decreases according to the hyperbolic law. The phase structure of the coatings does not depend on oxidation parameters and has x-ray amorphous state. The optimal micro arc oxidation parameters such as the electrical voltage of 200 v and the process duration of 5-10 min which allow to form the cap coatings with good properties and high hydrophilicity.

	15.6	CONT.INFO	katerina@ispms.tsc.ru
	15.7	KEYWORDS	micro arc oxidation / calcium phosphate coating / nanostructured titanium / wettability / hydrophilicity
16.	16.1	NAME	Anastasiya Levikhina
	16.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	16.3	LAB	Laboratory of Quality Control of Materials and Construction
	16.4	TITLE	Specifics of Welded Joint Destruction Obtained by Friction Stir Welding at Tensile Test
	16.5	ABSTRACT	The specifics of fracture of weld joint samples of aluminum-magnesium alloy, obtained by the friction stir welding (FSW) method at strain, have been studied. It has been shown that the weld joint contains aluminum-oxides, which are located on the surface of the conjugation of two sample parts. This imperfection leads to the effect when the initial crack spreads from the joint root over this surface of conjugation. The subsequent fracture proceeds over the basic metal of the joint.
	7.6	CONT.INFO	lev@ispms.ru
	7.7	KEYWORDS	friction stir welding / quality control / tribology
17.	17.1	NAME	Ivan Rodionov
	17.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	17.3	LAB	Laboratory of Shape Memory Alloys
	17.4	TITLE	Effect of Hydrogen on the Structure, Mechanical and Functional Properties of TiNi-Based Alloys with Coarse- and Ultrafine-Grained Structure
	17.5	ABSTRACT	N/A
	17.6	CONT.INFO	N/A
	17.7	KEYWORDS	N/A
18.	18.1	NAME	Anastasia Zaikina
	18.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	18.3	LAB	Laboratory of Physics of Surface Hardening
	18.4	TITLE	Tensile Fracture Behavior of Friction Stir Welded Joints
	18.5	ABSTRACT	Results of aluminum-magnesium alloy friction stir welded joints fracture investigations were put forward in the work. It was shown that there is a direct connection between the joint fracture mechanism and its formation mechanism. An analysis of the fracture topography of the broken specimen joints revealed that all examined specimen showed similar fracture pattern.
	18.6	CONT.INFO	zaikina.anastasija@yandex.ru
	18.7	KEYWORDS	friction stir welding / aluminum alloy / microstructure / tensile testing / fracture
19.	19.1	NAME	Stanislav Zharkov
	19.2	INSTITUTE	Institute of Strength Physics and Material Science, SB RAS
	19.3	LAB	Laboratory of Nanotechnology and Materials Science of Coatings
	19.4	TITLE	The Improvement of Microstructure and Wear-Resistance of Copper modified by Nitrogen Ion Implantation
	19.5	ABSTRACT	Change in wear-resistance of a copper friction pair after nitrogen ion implantation was investigated using tribological tests in argon atmosphere. The structural-phase state of the treated sample surface was investigated with TEM, the microhardness was determined using nanoindenter, the penetration depth of nitrogen ions was investigated by the secondary ion mass spectrometry. It was established that the high nitrogen fluencies ion implantation increase wear resistance of a copper friction pair 1.5-4.5 times as well as microhardness of the surface layer.
	19.6	CONT.INFO	zhastas@mail.ru
	19.7	KEYWORDS	microstructure / wear-resistance / ion implantation / surface layer / friction pair

20. 20.1 NAME Artem Ziganshin

20.2 INSTITUTE Institute of Strength Physics and Material Science, SB RAS

20.3 LAB Physical Mesomechanics of Materials and Non-Destructive Testing

20.4 TITLE Structure and Properties of Chrome-Vanadium Alloyed Cast Iron Produced by Electron Beam Deposition and Pulsed Electron Beam Modification

20.5 ABSTRACT Effects of pulsed electron-beam processing and subsequent annealing on structure and hardness of hardfaced chrome-vanadium cast iron coatings is presented. The coatings were obtained by electron-beam hardfacing on low-carbon steel substrates. After grinding, the coating surfaces were locally processed by pulsed focused electron beam in a multispot mode in a square packing on the surface area. The research results showed that the modified zones consisted of two phases: supersaturated austenite and the second phase locally distributed in the volume of modified zone is represented by the eutectic nucleation centers. The NanoTest data showed that modified zones have low hardness values. Low hardness values are probably caused by the presence of a significant volume of supersaturated austenite in the modified zone. A subsequent annealing of the specimens led to a significant increase in hardness of modified zones. As a result of the annealing (5000C), the supersaturated austenite was decomposed [...] eutectoid with nanoscale structure components. Increasing of the annealing temperature up to 11000C resulted in decomposition of supersaturated austenite and growth and coagulation of carbide phase in the modified zones.

20.6 CONT.INFO ziganshinartem@gmail.com

20.7 KEYWORDS electron-beam deposition / electron-beam processing / chrome-vanadium cast iron