RUSSIAN SPECIALIZED EXHIBITION DISPLAY-11

28 September – 1 October 2011

A REVIEW

SID Russia Chapter

Victor BELYAEV and Igor KOMPANETS

The Exhibition DISPLAY-11 is an event held in frames of XV Jubilee International Forum “Russian Industrialist”, which took place in St. Petersburg, “LENEXPO” Exhibition and Congress Center. It was the key industrial event in St. Petersburg, conducted since 1997 and gathering Russian and foreign industrial specialists. In 2010 the Forum received the Approval Sign of the Russian Union of Exhibitions and Fairs. “Russian Industrialist” is conducted under the patronage of the Russian Chamber of Industry and Commerce and Russian Union of Industrialists and Entrepreneurs.

Organizer – JSC “Lenexpo”

Official support:

- Ministry of Industry and Trade of the Russian Federation
- Plenipotentiary representative of the President of the Russian Federation in the North-West Federal district
- St. Petersburg Government
- Russian Union of Industrialists and Entrepreneurs
- Chamber of Commerce and Industry of the Russian Federation
- St. Petersburg Union of Industrialists and Entrepreneurs
- Russian Association of machine tools producers "Stankoinstrument"

The event DISPLAY-11 comprises following parts:

- Exhibition
- Technical seminars and business conference
- Lectures to students

Lectures program

Day of Display Technologies in Saint-Petersburg

29 September 2011

Schedule	Lecture title	Organization	Author
11:00-11:30	SID'11 and EuroDisplay2011 novelties review	SID Russia	Igor Kompanets Victor Belyaev
11:30-12:00	Displays with laser data visualization	SID Russia	Igor Kompanets
12:00-12:30	Displays based on free-form optical surface Application and prospects	Vavilov State Optical Institute, S-Petersburg	Mikhail Gan
12:30-13:00	Optical nanotechnologies for displays, telecommunication, lasers, medicine and solar energetics	Vavilov State Optical Institute, S-Petersburg	Natalya Kamanina
13:00-13:30	Autoemissive cathode displays on the base of carbon nanostructured materials	Moscow Institute for Physics and Technology (Technology University)	Eugene Sheshin
13:30-14:00	Structure and physical properties of nanocarbon sensitizers of optically acyive polymers	Karelia Scientific Centre of Russian Academy of Sciences	Natalya Rozhkova
14:00-14:30	Display glasses	S-Petersburg university of Civil Aviation	Yuriy Startsev

14:30-15:00	Panasonic history and new products	Panasonic	Stanislav Yermolinsky
15:00-15:30	Displays and lighting characterization: devices and methods	S-Petersburg University of Cinematography and Television	Vladimir Kuzmin
15:30-16:00	Nexcom multimedia panel computer	IPC2U	Alexander Kalintsev
16:00-16:15	NEC 23'' monitor premium drawing among students - lectures' visitors	NEC Display Solutions	
16:15-18:00	DISPLAY-2011 exhibition review and awarding the participants		

Lectures are organized by SID Russia Chapter
Technical sponsor - Ascreen Technology Co.

Students and professors of Saint-Petersburg universities

Igor Kompanets – chairman of the Day of Display Technologies Session

Students at Exhibition booths (Display, Vitebsk, Byelorussia)

Day of Display Technologies: schoolboys and schoolgirls supported by S-Petersburg municipal program “New Generation” at an Exhibition booth (so called “difficult teenagers”)

There are below summary of the lectures of interest for international cooperation.

Field emission displays on the base of carbon nano-structured materials (basics, status, prospect)
Evgueniy SHESHIN, MIPT

Some ideas have been presented on new materials and design for promising FED.
A design of an FED with edge-type emitter is shown in Fig.1.
Its advantages are low voltage and simple design.

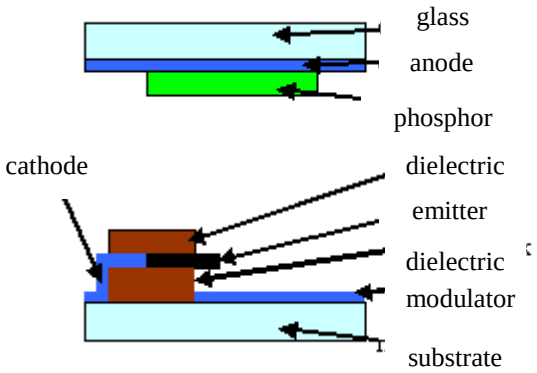


Fig.1

In Fig.2 there is a "two-stage" system based on edge type cathode with striped emitter and cathode. Bigger emitting area provides increased emission current and therefore emission brightness.

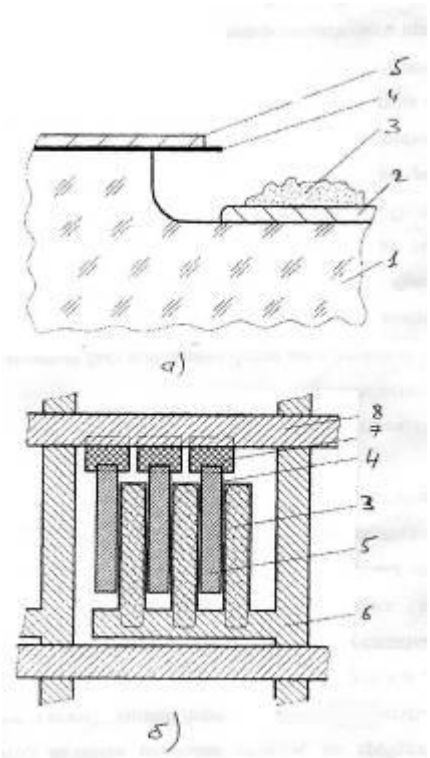


Fig.2. 1 –substrate, 2 – electrode, 3 – CNT array, 4 – gate support, 5 – gate, 6 – vertical bus, 7 – gate electrode, 8 – horizontal bus.

An example of a porous structure is shown in Fig.3. The pyrocarbon coating should provide a reduction of work of electrons output.

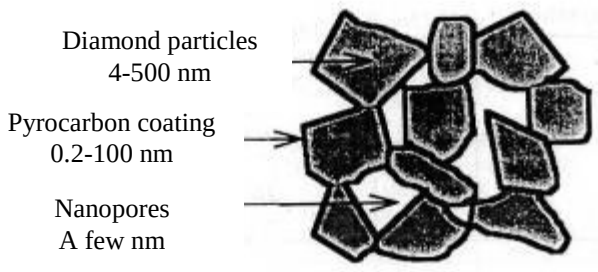


Fig.3

A design with increased efficiency owing to secondary emission is shown in Fig.4.

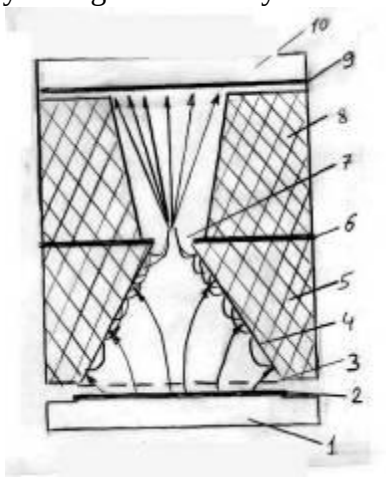


Fig.4

In Fig.4 AFM pictures of developed nanocarbon material structure are shown. In Fig.5 operation of lamp with using developed nanocarbon material at extreme ambient conditions is demonstrated.

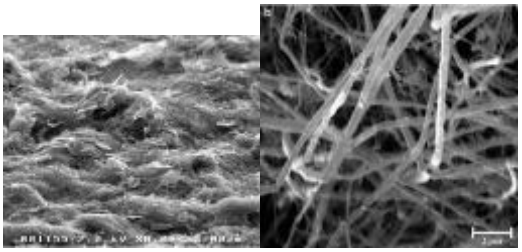


Fig.5. Nanocarbon material structure

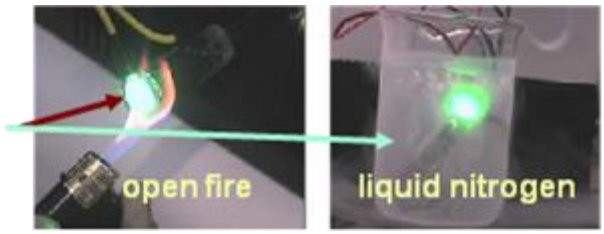


Fig.6. Operation of lamp with using developed nanocarbon material at extreme ambient conditions

- **Material advantages:**
  - Operating temperature range ±150˚C
  - A carbon fiber field-emission cathode structure with isolated emitters and carbon–nitrogen nanofibers have been developed.
- **Target Application**

- Backlight of LCD TV sets, monitors and laptops
- Outdoor and indoor big screens
- Light sources for flat lamps.

Optical nanotechnologies for displays, telecommunication, lasers, medicine and solar energetics

N.V. Kamanina, Saint-Petersburg

As an example of a new display technology: nanostructured LC media and promising method of LC alignment by using surface electromagnetic waves (SEW) have been presented.

A substrate surface processed by a SEW is shown in Fig.1. The smoothness is improved sufficiently.

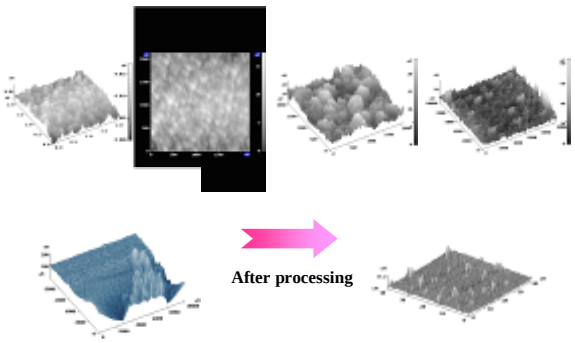


Fig.1

The design proposed has **advantages** as follows:

- ✶ Reduction of LC cell layers because the aligning layer is absent.
- ✶ Reduction of voltage.
- ✶ Increasing of the cell transparency.
- ✶ Reduction of switch time.
- ✶ Cost reduction.
- ✶ Technology simplifying.

Exhibition

LenExpo Exhibition Hall in Saint-Petersburg Haven

A booth of Russia SID Chapter at Display-11 Exhibition in Saint-Petersburg. From left to right: Igor Kompanets, Konstantin Morozov, Exhibition Director, Victor Belyaev

SUMMARY OF MOST IMPORTANT EXHIBITS

a) LED devices and systems

1. **Consource Co., Saint-Petersburg** http://www.consource.tv

LED video-panels with diode pitch 2.54 mm (1.7 mm is also available). There are no analogs world-wide.
Performances:
Brightness 3800 cd m^{-2}
Life time 50000 h – 100000 h
Exploiting temperature -40°C - +80°C
Humidity up to 100%

2. **Consulting & Technology Microcontroller Center KTTs-MK, Moscow** www.cec-mc.ru

OLED and PLED made in POWERTIP Co.

3. **Forma Engineering Co., Moscow**, http://www.formarent.ru

4. **JSC Svetlana-Optoelektronika, Saint-Petersburg**, http://www.soptel.ru

Design and mass production of semiconductor light sources and devices, full technology cycle – from epitaxy growing of hetero-structures to ready devices.

- **Advantages**

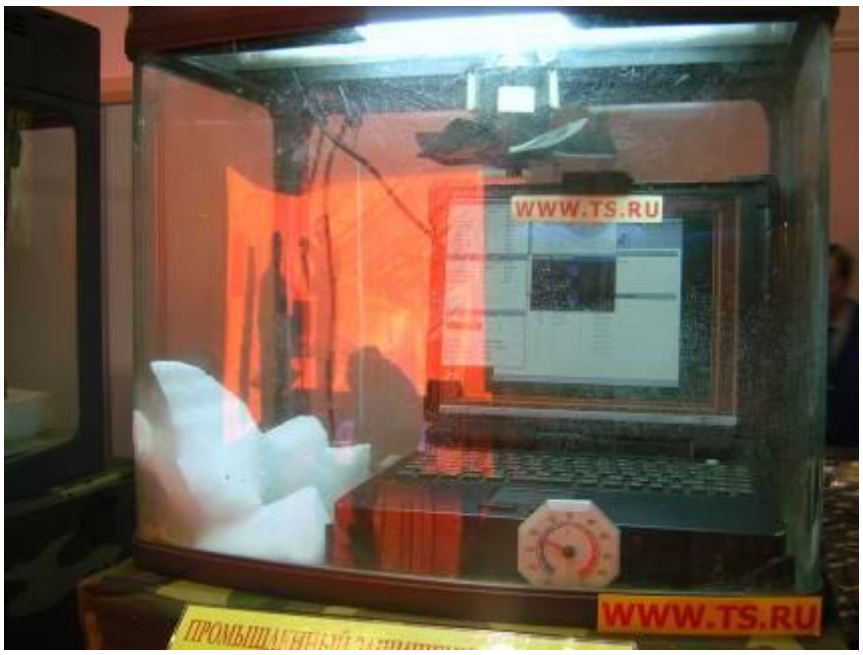
❑ Wide applications:

- Indicators
- Traffic signs
- Architecture
- Backlight

b) Rugged displays

5. **Science & Technology Corporation TECHNIKA-SERVIS / TS-SKN, Moscow,** http://www.ts.ru

Protected industrial note-books 7020T/EC1866, planchette computers Granat, pocket PC Kulon, all-weather computers Dozor-7100 and Taifoo-1900, monitors Voskhod

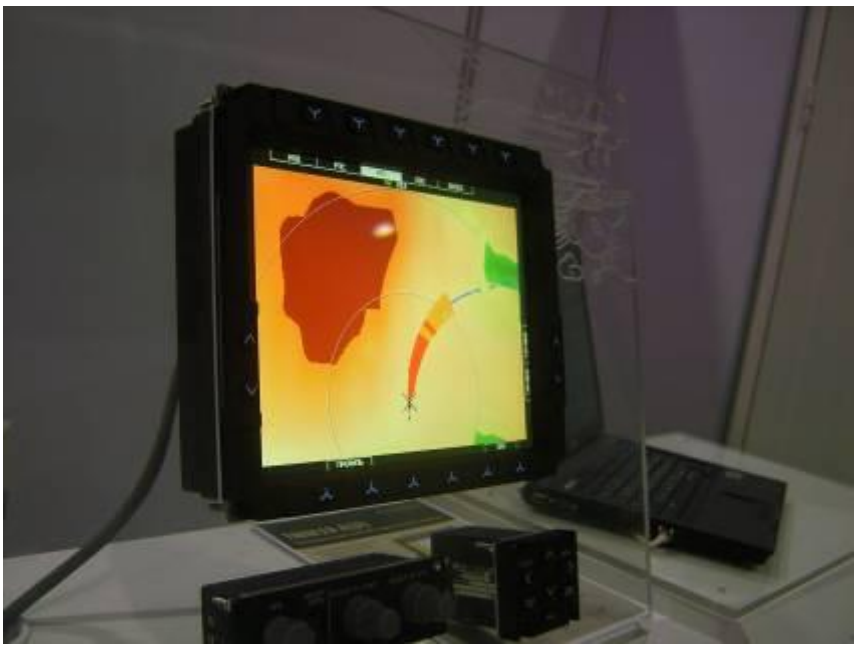


Test for frost

Tests for sand (at right) explosure protected notebook (at left)

6. **JSC TRANSAS (TRANsport SAfety Systems), Saint-Petersburg,** http://www.TRANSAS.RU

Rugged displays for specialized applications transport, industry, military, navy and ships



7. **RPKB (Ramenskoye Design & Engineering Bureau), Ramenskoye, Moscow Region**, E-mail: rpkb@space.ru

Leader of Russian avionics design.
Rugged displays.

8. **JSC Mobile Computer Systems (MKS), Saint-Petersburg**, http://www.mcs-info.com

Displays for transport, industrial, avionics application. Modules with size from 5” to 30” and brightness up to 2500 cd m^{-2} and temperature range from -55°C to +85°C. Backlight: CCFL and LED.

9. Design Bureau DISPLAY, Vitebsk, Byelorussia

Displays for special applications (military, navy, industrial)

A ship navigation system

c) Display components

10. IZOVAC, Minsk, Byelorussia, www.izovac.com
Display glasses and films

Heating glasses including glasses for TFT matrices:
Transmission >85%
Mirror reflection 1.5%
ITO surface resistance 8-30 Ohm/□

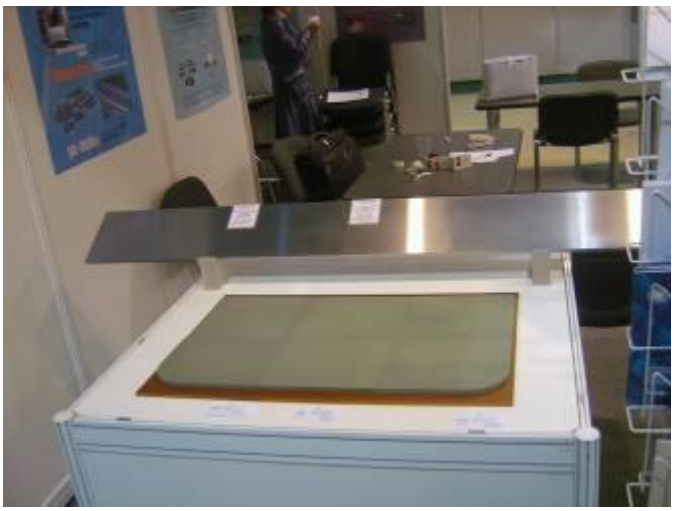
EMI protection glasses:
Transmission >80%

Mirror reflection 2%
ITO surface resistance >2 Ohm/□

11. POLLEMA, Industrial Metallurgical Holding, Moscow, Tula

POLLEMA is one of the world's leading producers of electrolytic chromium metal and chromium products, molybdenum and tungsten products, metal powders and composite materials.

The company holds top positions in all major global markets of electrolytic refined chromium, high-purity chromium sputtering targets, rolled items, Mo and W products, and high-precision contact materials.



Pollema's ZnO target – a promising material for the TFT

12. TAIR, Scientific and Production Enterprise, S-Petersburg

Stereo Projection System "SPS"

- A novel stereo-projection system for comfortable viewing of 3D images without any stereo-glasses
  - Image quality: ≥HDTV
  - Stereo effect depth up to 1000 m and more
  - High brightness of the stereo image, seeing at ambient luminance ≥20000 lx
  - Confidential viewing of stereo images
  - Natural agreement of convergence and accommodation of operator's eyes

– Wide-format, horizontal viewing angle ≥50°

13. Microvideosystems, Minsk, Byelorussia

Very reliable and skilled partner for display components and products distribution and their promotion to the markets of Russia and Commonwealth of Independent States (CIS). Director – Vladimir Vyssotskii – Chairman of SID Byelorussia Chapter

14. Shenzhen ASTAR Technology Ltd., China

The company is specialized in digital product's researching, manufacturing, and marketing in Taiwan、South-EastAsia、Europe and America. Shenzhen ASTAR Technology Ltd. , which provide service to the worldwide market, is a cooperational company of EMPIRE OVERSEAS GROUP. The company's current main product is digital television.

15. QOMO HiteVision, Russian office in S-Petersburg

The company produces interactive equipment for business and education.

16. Mediavisor Ltd., S-Petersburg

The company is a constructor, designer and producer of unique interactive rear projection systems and touch screen LCD solutions indispensable for effective education process and presentation, information purposes.

First demonstration of these products in Russia

17. Megalit Elcom Co., S-Petersburg

The company supplies electronic components including LCD monitors, modules and controllers. The company produces payment and information terminals, GPRS modems, GPS acess and navigation control systems.

18. Sensor World Co., Moscow, S-Petersburg
Distribution and production of devices with touch panels

Technical seminar

28 September

Visit to Russian State Hydrometeorology University, S-Petersburg.
Demonstration of QOMO interactive equipment for education purposes.
Speakers: Ruslan Chichikin, Igor Lisovskii, Vladimir Ivanov