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Dear ,

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MESSAGE FROM NEIL B. GODICK

Some facts about the Internet in Russia….

#1 - The Public Opinion Foundation (POF) reported that only one-fourth of Russians use the Internet from home.

The majority of Internet users reside in Russia's two largest cities: Moscow and St. Petersburg. In these cities 50% of the population uses the Internet. For other Russians, especially those living in rural areas, the Internet remains unaffordable. Monthly Internet fees amount to approximately 3% of the monthly budget. In rural areas Internet usage is in the 12% range.

#2 - The All-Russia Public Opinion Research Center (VTsIOM), reports that the number of Internet users in Russia is 31%. They determined only 11% of Russians use the Internet on a daily basis, 9% of respondents use the Internet a few times a week, 7% - a few times a month, and 3% - a few times a year.

#3 - VTsIOM sociologists estimate that most of the Ru-Net users are educated youth. 26% of the daily Internet users are 18 to 24-year-old Russians, a quarter of whom have higher or incomplete higher education degrees.

We do not intend for these reports to solve any need our readers may have. We do intend to keep everyone current on technology developments in Russia. If you would like any additional information on any of the developments reported – send us a note.

Nanostructural composite materials

OAO Central Design Bureau of Special Radio Materials (OAO TsKB-RM), Moscow has developed nanostructural composite materials for use in electromagnetic protection devices. The devices will be used for biological objects in a wide wavelength range.

The protective effect is provided by creating a structure with stable volume. The nanostructural materials result in constant electromagnetic protection independent of the object's spatial location. Additional protection is ensured by improving matching and

radio engineering parameters. The electromagnetic energy absorbent contains two joined layers; each layer is a plain mesh weave. The mesh contains flexible cylindrical elements. Each cylindrical element has current-conducting microdipoles radially extending from the cylinder. The relationship between the microdipoles' running resistance in the first and second layer is 2 to 10. Microdipoles are made from complex glass threads, paired with amorphous ferromagnetic microwire.

The basic advantages are:

- low cost; 1 m^2 of the material is half of that of its analogs;
- improved shielding: reduces the electromagnetic radiation strength 10-1000 times.

Production process for heavy-duty springs

***Izhmash* machine-building Group (Udmurtia),** jointly with ***Rosnano* State Corporation** and ***Uralsib* Bank,** have established production for heavy-duty springs using nanotechnologies. Using the experienced they gained in manufacturing small arms, the Group moved to a new economic niche - Russia's first effort to manufacture super high strength springs. The target applications for Izhmash's new products are: railroad transport, power engineering, auto making, agricultural machinery, and elevator systems.

At the technology's core is hot coiling the spring at an optimum combination of:

- heating temperature,
- deformation degree at coiling,
- procedure and consecutive cooling-quenching mode for each spring coil.

These operations result in forming nanosized structures that ensure the spring's high strength characteristics. Springs produced using this method have:

- a longer service life and a higher stress level.
- reduced spring settling and spring coil impingement
- increased working capacity at low temperatures.

Anti-wear nanomodification composition

OOO Research-and-production Center *Konvers-Resurs* (Moscow) has developed an anti-wear nanomodification composition - Striboyl. Striboyl is for friction units made from alloys based on iron or non-ferrous metals. The composition is made from a lubricant material and an additive. The additive is a high-dispersion mineral suspended in a lubricant. Select natural minerals are pre-ground in a mill, subjected to magnetic separation, introduced into a liquid lubricant, and disintegrated to a mineral particle size less than 1 µm. The mixture is allowed to settle, and the suspension formed over the sediment is used as the additive. The natural minerals and their component ratio in mass % are: serpentine (lizardite and chrysotile) 80-87, chlorite 2-3, magnetite 1-2, amakinit 1-2, calcite 0.5-1, x-ray-

amorphous phase 9-12. Immediately before disintegration, soft metal fatty acids salts and glycerin are introduced into the liquid lubricant to form a colloidal solution with mineral particles using ultrasonics.

The material is designed to restore and increase mechanical equipment reliability. Advantages:

- 1.5 – 2 times increase in equipment service life and TBO;
- 20 – 30 % decrease in the friction coefficient;
- 5 – 15 % fuel and electric power saving;
- exhaust gas emission toxicity reduction and an up to 5 % decrease in the soot content in ICEs;
- decrease in equipment vibration and noise.

Devices based on vortex tubes for cooling and heat transport in conditioning systems

OOO Design Bureau CHKZ-YUGSON (Ekaterinburg) develops devices based on vortex tubes for cooling and heat transport in conditioning systems. These devices do not contain any Freon, ammonia of the other hazardous substances, have a simple design, and require minimal maintenance. Refrigerating (heating) installations based on vortex tubes use air as a coolant and cold carrier. Unlike traditional vapor compression machines these installations are ecologically pure and safe. The capital outlays for vortex systems design and installation and operating costs are lower than conventional systems. Currently available vortex tubes can be used to develop:

- large-scale air-conditioning systems for sports facilities, shopping and entertainment centers, etc.,
- medium-and low-power air-conditioning installations.

The climate-control systems can operate as heaters and coolers, have low weight and small dimensions, can be easily built into vehicles, and have a quick startup time.

Environmentally-friendly manufacturing method for wood products

Scientists from the **Institute of Problems of Chemical Physics, RAS (Moscow oblast)** jointly with employees of *Khimfist* factory have developed a new environmentally-friendly manufacturing method for wood products (wood chipboard) without using synthetic binding resins. As they decompose under temperature and pressure, wood fibers can form natural bonds among themselves. The material becomes stronger, less porous and acquires several advantages over traditional wood chipboard products. The composite material is formed by pressing at temperatures up to 300 ºC and higher with cyclic mechanical impact at up to 50 atm. on the wood chip material. At this temperature and pressure, the filler wood fiber cell walls are destroyed; resinous substances are released into interfiber pores. The resin polymerizes resulting in wood chip composite material with a density up to 2 g/cm^3. This production method for composite materials is ecologically friendly both in the manufacturing process and final product. The product lifetime is practically unlimited, as the wood resins are preserved within the cell

walls. The one-step process is simple and short. The product's strength, water- and fire-resistance are several orders of magnitude superior to traditional chipboard. An additional advantage is that practically any waste wood, including rotting and rotten wood, can be used without affecting the chipboard quality.

Enzyme for producing drugs and cosmetic creams

OAO Moscow Committee for Science and Technologies (MCST) has patented a collagenase enzyme - *Ultralizin*. This is a substance for producing drugs and cosmetic creams. The enzyme selectively reacts to soft tissues and skin. This microbial-origin collagenase ultrafiltrate is isolated from a Streptomyces lavendulae VKPM S-910 culture. The collagenolytic activity is 1800-2500 KEA/ml and proteolytic activity is 120-200 PE/ml. Ultralizin's effect is obtaining a biologically active ultrafiltrate with high collagenolytic and proteolytic activity for effective application in various wound-healing preparations and in dermatology.

Biotechnological production process for pharmaceutical proteins

Scientists developed a biotechnological production process for pharmaceutical proteins. A new system for effectively producing human lactoferrin in hen's eggs has been developed and verified. The work was performed by a research team from **N.F. Gamaleya Research Institute of Epidemiology and Microbiology, RAS** jointly with researchers of **P.A. Herzen Moscow Oncology Research Institute**. According to the specialists, the system provides a new lactoferrin production technology the leads to reduced lactoferrin costs; it can also be used for producing other pharmacologically valuable proteins.

With the new system to obtain protein, there is no need to build an alien gene into an organism. This considerably accelerates and simplifies the process for obtaining the end product. The system developed is based on the lactoferrin gene introduction into fertilized eggs aided by CELO adenovirus particles. This is an abundant virus, which does not cause any serious diseases in adult birds. Fertilized eggs are infected by this virus, can accumulate significant viral protein quantities. The researchers have shown that the resultant human lactoferrin could be as high as 0.8 mg per egg.

Isolated protein's physical and biological characteristics produced using this technology did not differ from natural lactoferrin and has all the necessary chemical modifications. Thanks to its simplicity and low cost, the system can be used to obtain other pharmaceutical proteins.