PHLburg Technologies, Inc.

1275 Drummers Lane
Suite 101
Wayne, PA 19087

Telephone: 610-688-6800
Fax: 610-975-5800
Website: phlburg.com

March, 2012

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MESSAGE FROM NEIL B. GODICK

Spiritual Health

In February the Russian Orthodox Church opened a hot line to help fight *superstition* and promote the practice of confession instead.

The Church will be supporting a telephone line for those followers to get clear answers from an operator about church practices and reasons to attend services. Operators will have a higher theological education.

The church said the program is designed to help believers who "found themselves under the influence of destructive cults and sects. People come to church and cannot always get a full answer to their questions because the priest may be busy or absent. We want people to be able to get to a clear response with no superstition, which arises as a result of ignorance."

The service will initially be available to the faithful in Moscow and is expected to be expanded nationwide.

and Physical Health

A recent survey reported that Russians are among the most dissatisfied in the world with their health and well-being, having great distrust for the health-care system and deep concerns about the environment.

Russia ranked 27 of the 30 countries featured in the health and well-being index created by Philips and researcher Ipsos.

The Russia survey covered Moscow and all of Russia’s regions.

"The results of the survey demonstrate a need for significant improvement in the health and state of well-being of the Russian people," said Arjan de Jongste, CEO of Philips in Russia and the CIS.

According to the findings, the most important factors determining Russians' health and well-being were the cost of living and family

relations.

The survey reported that only 13 percent of Russians regularly visit doctors and more than one in three rarely have medical checkups. Two-thirds of Russians choose to rely on vitamins, homeopathic remedies and other nontraditional treatments to stay healthy, rather than consult a doctor.

Among respondents' major health concerns were: declining medical service quality, increasing medicine prices, and ineffective government legislation.

The dire health-care outlook has led the government to vow to triple health-care spending to $45 billion by 2015.

This leads me to Russia's March 4 Presidential election. Former president and current Prime Minister Vladimir Putin is almost certain to be reelected President on March 4th. In the run up to the election Mr. Putin has issued a series of *white papers* putting forth his strategies for fixing Russia's health care system and all the ills that plague Russia. Mr. Putin is counting on you and me to pay higher gas prices so he can keep his campaign promises. Without extremely high oil/gas prices Mr. Putin cannot keep his costly promises.

We do not intend for the following 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.

A nanotechnology for atherosclerosis treatment developed at Skolkovo

Nanokor – a company from Tomsk –and chemists from the **R&D Institute of Cardiology, RAS (Siberian Branch) and Tomsk Polytechnic University.**

The developers make the argument that conditions conducive to atherosclerotic plaque growth in a human artery can be compared to a factory. In the human body there is, they assert, a 'pathology miniconveyor' which delivers its 'miniproducts' for plaque formation and growth. This chain contains many components. All of the complex mechanism's subtleties are not yet fully known. The authors believe that acting on some link in this chain and breaking it will arrest atherosclerotic plaque body growth.

The technology's essence lies in destroying atherosclerotic plaques in veins using bioactive nanoparticles. After experimenting a year, the scientists identified the correct nanoparticles. They have chemically modified them by attaching a chain of radicals to nanoparticles so that they interact with the plaque substance.

Subsequent morphological work showed that this material can penetrate the plaque and change its structure. The scientists have

applied for a patent for their invention.
#2012-02-216

Rose-like nanoparticles from soot

By irradiating technical carbon with an electronic beam, Russian researchers obtained nanoparticles with novel morphology. Synthesis simplicity and source material availability make this method attractive for industrial applications.

In addition to the widely known carbon structures - carbon nanotubes, fullerenes and graphene - there are also others (like nanoglobules, nanofibers, nanodiamonds, and nanobulbs). All of them have already found application in various industries. For example, nanobulbs, which are carbon spheres enclosed within each other, serve as good lubricant, and nanodiamonds are actively used in polishing formulations and wear-resistant coatings. The potential number of nanostructured carbon material varieties is unknown. As each novel form is discovered new opportunities for application are opened up.

This new carbon structure was synthesized by **researchers from Omsk Research Center, RAS (Siberian Branch), Institute of High-Current Electronics, RAS (Siberian Branch) and the Institute of Hydrocarbon Processing Problems, RAS (Siberian Branch).** To make the structure, scientists placed technical carbon (soot) into a graphite crucible and covered it with a copper diaphragm containing a small aperture. Then the crucible is placed in a vacuum chamber where the soot was bombarded by an electronic beam through the aperture in the diaphragm. This resulted in reducing the initial powder weight in the crucible and in carbon sedimentation on the copper diaphragm. Using electronic microscopy the researchers studied the residual and precipitated carbon fractions and found that radiation caused the carbon soot's structural reorganization. The result was nanoparticles with a peculiar morphology somewhat resembling a rosebud cut.

Although it could be assumed that these 'rose-like' particles are no different from carbon bulbs; that is not so. Carbon bulbs' carbon spheres are closed and inserted into each other like in a Russian matryoshka doll. On the contrary, the synthesized particle has no clear-cut concentric spheres. Instead is appears as broken graphene layers located circumferentially. The scientists are still looking for possible applications for the synthesized material. They believe the new structures can be further reorganized for other uses, in particular, for manufacturing nanodiamonds. The detonation method widely used for developing diamond structures is somewhat dangerous and therefore the researchers are looking for safer synthesis methods.
#2012-02-217

New anti-icing reagent

A novel environmentally friendly anti-icing reagent was developed by scientists of Tver State Technical University. Its

composition includes natural peat and organic additives.

According to the developers, the new product (*Rastopit*) when applied to an icy road surface makes it rough, similar to a rasp or grater. Due to its black color, the reagent also absorbs sunlight, heats up, and literally melts the ice crust. The project's lead scientist claims that the reagent is environmentally friendly, harmless, and in future can be used as a fertilizer.

In addition, the new product is much less expensive than its analogs.
#2012-02-218

Arkhangelsk scientists develop a material that considerably improves concrete and wood properties

Scientists from the Northern (Arctic) Federal University are developing a nanocomposite targeted at significantly improving the building material properties. It uses new materials based on local raw materials – sand and saponite (a diamond-mining industry waste).

Using the components in a specific combination taking the nanosized particles' characteristics into account, very strong bonds are formed between them. In this composition mixture can be used to replace cement, for example, in concrete. This increases the concrete durability 20 times.

To produce this effect, the optimum component combination and process conditions were identified. The scientists developed a nanopowder that enhances the properties for both concrete and wood. The authors proved that treatment with the composite material makes a wood surface stronger, refractory, water-proof and cold-resistant.

The same powder makes concrete stronger and cheaper to produce. Moreover, the powder is ecologically safe.
#2012-02-219

Reconditioning technology for worn-out pipelines

ZAO NPF Vostok innovation company at Irkutsk State Technical University introduced a novel reconditioning technology for worn-out pipelines that extends their service life. This technology's unique character enables cleaning pipes with virtually any geometry (including bends). This technology is unlike competitors' technologies: the competitive technologies can only clean straight pipeline sections.

The technology is based on a series of patents describing a mechanism able to move inside a pipe and effectively abrade the inner surface.
#2012-02-220

Siberian physicists produce the thinnest diamond films in the

Siberian scientists have mastered producing 30 nm thick diamond films. This is an order of magnitude thinner than those currently being produced in Europe or the USA.

With thinner microcircuit material a lower parasitic effect and lower power input requirements results. Therefore a nanosized film is a perfect substrate for microcircuits. For example, silicon films down to one nanometer thick developed at the **Institute for Semiconductor Physics, RAS (Siberian Branch)** are used by Rosatom and Russian Space Agency organizations to develop radiation tolerant electronic devices; RAS and RAMS institutes use them in their nanoelectronic devices and biosensors.

Currently diamond films down to 300 nm thick are produced in several laboratories around the world, but all their indisputable advantages are canceled out by the residual flaws that arise when the film is separated from the crystal.

The technology authors found a way to avoid flaw formation during every process stage and to preserve the initial synthetic crystal structure grown at the Institute of Geology and Mineralogy, RAS (Siberian Branch).

Using quantum optical effects in diamond microcircuits will increase PC computing power by several orders of magnitude. Moreover, diamond microcircuits can work at temperatures up to + 800ºC. This, among other things, allows making devices for direct control and regulation of jet (and other) engine operation.

The author's goal is to develop a technology to produce diamond film microcircuits. Once this is achieved, it will oust silicon microelectronics from the market. This requires growing a crystal with predetermined properties, learning how to peel off thinnest films from it, and building other chemical elements into its crystalline structure (i.e., alloying it) in order to raise its low electrical conductivity.

#2012-02-221