
Editorial

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Biographical notes: D.S. Andreyuk graduated in 1997 from the Biological Faculty of the Moscow State University named after M.V. Lomonosov (MSU). After getting a PhD in Biology (1999), he worked in the Biological Faculty of MSU. From 2004 till 2012, he worked in the NT-MDT Group, the last position was Director of Marketing. Now, he works as Executive Vice-President of the Nanotechnological Society of Russia (NSR) and Executive Director of the Russian Association for the Advancement of Science (RAAS). His academic positions are in MSU Faculty of Economics, and in Mental Health Clinical Hospital No. 1 named after N.A. Alekseev of Moscow Health Department.

This special issue presents a number of articles from which one can trace a curious trend in the evolution of Nano, namely, the tendency to shift from academic research to the development of applied technological solutions.

Chemical technologies for the synthesis of nanoparticles and modification of their properties still form the basis of progress in the field of new materials. In this issue a new chemical method for the synthesis of magnetic nanoparticles of the intermetallic compound $\text{Nd}_2\text{Fe}_{14}\text{B}$ is proposed. In addition, a method for the synthesis of ferromagnetic nanoparticles immobilised in a carbon matrix by an electric arc discharge in a liquid phase is described. In most technologies, nanoparticles are not of interest per se, but to impart certain useful properties to the bulk material. So Al_2O_3 nanoparticles synthesis is developed and studied regarding its influence on the fire behaviour of nanocomposite materials based on unsaturated polyester resin. In another work titanium dioxide nanoparticles were studied as a corrosion inhibitor.

An interesting block of technological work is related to giving materials, thin films and surfaces certain optical qualities. For instance, silver deposition in electrochemical process was used for silver inverse opals preparation. Reflectance optical spectra of the silver inverse opals showed various plasmon excitation modes in a visible spectral range according to the Bragg effect making the silver opals attractive for the Surface-Enhanced Raman Spectroscopy. Electrochemical formation of the transparent semiconductive oxide coverage of zinc oxide performed in another work is promising for applications in optoelectronics, sensors and chemical technology because of its easy scaling and ability to deposit ZnO on complex surfaces.

Analytical methods are presented by short comparative description of high energy methods applied for characteristic X-ray radiation emission excitation including fluxes of

X-ray hard radiation and beams of high energy ions and electrons oriented on the element analysis of planar nanostructures.

Expanding horizons: looking deep into the nucleus and far into the millennia. It could be a motto of two theoretical articles. One of them suggests computational approaches to the study of nanophenomena outlining directions for the development of quantum subatomic nanotechnologies. In the second one a socio-humanitarian research aims to answer the question – whether it is possible to identify such behavioural patterns or ‘programs’ that largely determine the trajectory of human civilisation. Starting from the success of biological sciences in understanding the mechanisms of nanoscale molecular machines involved in gene regulation, the authors try to look for answers in the analogy between society and mathematical neural networks, proving that this is a promising approach for quantitative study of evolutionary processes on a millennial scale.