



**DECOMPOSITION OF NITRIC OXIDE(I) ON THE FERRITE  
WITH DIFFERENT CRYSTAL STRUCTURES**

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**ABSTRACT**

Catalytic properties of cobalt ferrite  $\text{CoFe}_2\text{O}_4$ , magnesium  $\text{MgFe}_2\text{O}_4$ , copper and calcium  $\text{CuFe}_2\text{O}_4$   $\text{Ca}_2\text{Fe}_2\text{O}_5$ , obtained by mechano-chemical synthesis method, decomposition reaction of nitrogen oxide(I) in reaction gas mixtures 1 % -  $\text{N}_2\text{O}$  99 %-Ar; 1 % -  $\text{N}_2\text{O}$ , 99 %- $\text{N}_2$ ; 1 % -  $\text{N}_2\text{O}$  99 % air were studied. It has been established that the decomposition of  $\text{N}_2\text{O}$  takes place at oxygen vacancies in ferrite with forming atomic oxygen as an intermediate. It has been revealed that ferrites under investigation are highly active in this process, but  $\text{CoFe}_2\text{O}_4$  possess the best catalytic properties.

**ANALYSIS OF INFLUENCE NANOMODIFIED POLYCARBOXYLATE PLASTICIZERS  
ON STRENGTH AND RHEOLOGICAL CHARACTERISTICS  
OF CEMENTITIOUS COMPOSITES**

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**ABSTRACT**

The article concern the problems of increasing the strength and rheological characteristics of cement composites. The results of the researches the efficiency of introduction the modifiers based on the soluble adducts of carbon nanoclusters «Ugleron® C» in gyperplasticizers Melflux (1641 F, 2642 F, 2651 F, 5581 F) and superplasticizer SupraNaft are shown. Using the optimal concentrations of the modifier it is possible to significantly reduce the consumption of plasticizers without losing the technological properties and the main characteristics of the cement composites.



## **EFFECT OF ENERGY PRODUCTION ON THE ENVIRONMENT**

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### **ABSTRACT**

In this paper, an impact of energy production on the environment is discussed. It was shown that burning of fossil fuels was accompanied by emission of greenhouse carbon dioxide gas and water vapor, as well as harmful gases (carbon monoxide, sulfur and nitrogen oxides). In recent years a great attention is paid to alternative energy sources – electricity, hydrogen, biofuel, solar and wind energy, etc. However, the production of electric energy is based mainly on the fossil fuel and therefore use of electro-mobiles cannot improve the environment. The energy production from hydrogen is considered as ecologically-pure, since as a result of hydrogen combustion only water is formed; however it is not true statement because the water vapor creates a strong greenhouse effect. The use of biofuels reduces the negative greenhouse effect. The production of solar and wind energy is not accompanied by forming of greenhouse gases or vapors, but they are also not safe for the environment. Thus, the expanded energy production requires consideration not only the energetic and economic factors, but also environmental factors in order to maintain a reasonable balance between obtaining of the needed energy amount, on the one hand, and minimizing of damage to the environment, human and animal, on the other hand.

## **PRODUCTION TECHNOLOGY DEVELOPMENT AND CREATION OF PRODUCTION OF ADDITIVES USED IN SOLID ROCKET PROPELLANTS**

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### **ABSTRACT**

Solid rocket propellants are heterogeneous and filled polymer composites. They are widely used in both military and civilian purposes. In this paper we summarize the experience of creating small-scale industries for production of chemical additives for solid propellants. Analysis was made of their use in the processes of production of various types of solid propellants. Shows the different additives influence on the processes of manufacture, storage and combustion of solid rocket propellants.



**ADVANCED NANOMATERIALS BASED ON SOLUBLE SILICATES**

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**ABSTRACT**

Were considered properties of water-soluble high-modulus silicate systems: based on alkali metal polysilicates called liquid glass and chain their transformations from lower to higher oligomers, with the subsequent formation of colloidal solutions - silica sols. Methods of preparation, properties and applications of water-soluble high-modulus silicate systems were analyzed. Were shown the possibility of their use as a binder and modifying agents for various nanostructured composite materials. Examples of promising areas of application of liquid glass and high modulus of aqueous solutions of silicates in construction and industry are presented. In particular show the possibility of using liquid glass and aqueous solutions of silicates in the production of nanostructured silicate polymer concrete. In rocket and space technology for the manufacture of water destroyed mandrels used in the manufacture solid fuel rocket engine housings and pressure vessels “cocoon” of composite materials by winding method. It discussed the use of the sols to obtain inorganic nanocomposites ceramics and monolithic blocks of silicon oxide, which can be used in various fields of modern technology.ere shown the possibility of using silica sol as a binder for the ultra-lightweight refractory thermal protection materials used to protect equipment from high temperature impacts. Directions of development of production of new materials and acid-resistant linings, chemical protection equipment, parts and components operating in corrosive environments have been proposed.

**CATALYST CONFORMATION “EVO<sup>®</sup>LUTION” IN FRICTION ZONES  
OF DIAMOND LIKE CARBON FILMS**

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**ABSTRACT**

The article describes analysis of research work made abroad in the field of diamond like carbon (DLC) covers and conformation of “Evo<sup>®</sup>lution” synthesized catalyst which forms - DLC films in friction ties.



**DEVELOPMENT OF INNOVATIVE TECHNOLOGY OF ADVANCED MACRO -  
AND MICROFERTILIZERS APPLICATION ON SPRING RAPE  
USING NEW (NANO ) MATERIALS**

*Dedicated to the blessed memory of  
Prof. Ruban Igor Nikolaevich*

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**ABSTRACT**

**Nutrition micro- and mesoelements, as also intense activity plant growth regulators and other physiologically active substances, depending on the crop variety, cultivation conditions and possible risks, can be added to such pre-sowing treatment (nano)technologies.**

**Using physiologically active, complex, polyfunctional, multicomponent (nano)systems – (nano) chips in the pre-sowing rice treatment (nano)technology allows precise seeding; enhancing field seed germination; reducing plant morbidity rate considerably or even deleting disease incidents; increasing plant adaptability to unfavorable environmental conditions; expanding crop yield; improving products quality by not using toxic chemical means of plant protection; intensifying competitive ability of agricultural products as well as assuring environmental safety in crop cultivation regions.**



**ADVANTAGES IN CHEMISTRY AND TECHNOLOGY  
OF NON-ISOCYANATE POLYURETHANE**

1. **SPRAY APPLICATION OF HYBRID INSULATION FOAM**
2. **NEW NONISOCYANATE HYDROXYURETHANE CONTAINED HARDENERS FOR EPOXY COMPOSITION**

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**1. SPRAY APPLICATION OF HYBRID INSULATION FOAM**

**ABSTRACT**

This article describes a method for producing two-component nonisocyanate insulating foam and technology of its spraying on the insulated surface. It describes the device, which, along with standard equipment, includes principally new design of components intermediate chamber. Constructive solutions described in the article will allow the use of compositions, which have different times and temperature for curing than conventional PU foam.

**2. NEW NONISOCYANATE HYDROXYURETHANE CONTAINED  
HARDENERS FOR EPOXY COMPOSITIONS**

**ABSTRACT**

Hardeners for epoxy base compositions of novel type – Uramines – were elaborated by the authors. Due to presence of hydroxyurethane modifiers the Uramines impart to cured compositions the best properties of epoxy and urethane coating materials. Created on the nonisocyanate base, Uramines don't have the toxicity of conventional urethanes. Uramines aimed for receiving wide range of coating materials (clear or colored, filled floorings, paints, etc.) with needed properties depending of base used, in particular: ~ 100 % solid; water based; high abrasion resistant; high weather resistant; improved chemical resistance, flexibility, impact resistance, adhesion to substrates, etc.; excellent appearance. As a rule Uramines provide fast curing.



## NEW SYNTHETIC POLYMER STRUCTURES FOR THERAPEUTIC APPLICATIONS

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### ABSTRACT

New chromatographic media have developed for effective industrial manufacturing of very deficient and expensive IgG from human blood plasma. Structural formation of polymer media is produced by directional synthesis. High work parameters of materials are provided by thermodynamic conditions of polymerization. Specific interaction arising between microelements of developed structure on the initial stage polymerization up to the gel point regulates competitive processes of intra- and inter-molecular crosslinking processes. Energetic interaction is illustrated by temperature variations as function time of polymerization. Heat release arises during the reaction copolymerization by inter-or intra –molecular crosslinking processes and heat absorption arises during the processes of structuring. Heat effects are adjusted with early researched Haggins parameters, viscosity and molecular sizes of micro – regular structural elements by concentration variation during the copolymerization, processes and content of unsaturated double bonds and amount of sol-fraction too. New media are very effective for purification of various nature proteins. There are materials of multiple using. New media are base of high effective IgG purification technology.

## CORROSION OF HARD FACING MATERIALS EXPOSED TO MINE WATER CONDITIONS

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### ABSTRACT

Corrosion damage can cause major failure of mining pumps that would lead to degradation of other mining equipment, as a result of leakage, thus leading to a high rate of replacement and maintenance of pumps and surrounding equipment. Hard facing materials are used to protect moving parts against mechanical and corrosion damage. This paper presents the corrosion behavior of two materials exposed to synthetic and acidified mine water. The materials were a corrosion resistant Hastelloy G30 and a hard facing material, a nickel-chromium-iron (Ni-Cr-Fe) alloy (both high chromium nickel-based alloys). Only the corrosion characteristics of these alloys in synthetic mine water were studied using potentiodynamic polarisation. The results showed lower corrosion rates for Hastelloy G30 than for Ni-Cr-Fe. The microstructures of the alloys were characterised using optical microscopy; X-ray diffraction (XRD), and microhardness testing was also performed.