



**ULTRASONIC NANOSCOPY METHOD OF NDI:  
EXPERIENCE OF APPLICATION**

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**ABSTRACT**

Two articles are proposed in the frame of headline: “Evaluation of the material Blades Resource Exhaustion of Turbine Engines “and “Ultrasonic Oil Waste Nanoscopy”. First article describes a non-destructive inspection method of gas-turbine engine blades. This method is based on sending ultrasonic signal into blade material and receiving ultrasonic impulses, reflected from nanocracks located in intercrystalline substance of the blade. It shows resource exhausting level of the blades. Experiments were based on this method. Its results are represented in this article. Second article is about measuring process of oil content in industrial sewage. It was made a review of existing control methods. It was created a mathematical abstraction of ultrasonic impulses reflection from oil drops. On the base of just created mathematical abstraction it was made experimental research, its results are represented in this article. Analysis of mathematical model and experimental research show that amplitude of reflected signal is directly proportional to volume of the oil drop in water. It allows to develop ultrasonic complex for directly measuring of the oil content in water.

**NANOCOMPOSITES BASED ON POLYBUTENE-1:  
STRUCTURE AND PROPERTIES**

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**ABSTRACT**

Structure and properties of nanocomposites based on polybutene-1 and nanoclay “Cloisite 15A” are studied. It was showed that, nanoclay compounded in polybutene-1in quantity of 5% is an effective additive, improving some physical, thermal and mechanical properties. Polypropylene modification by polybutene-1 enables significantly to improve the quality of obtained fibers.

## **NANO-SILVER AS A POTENTIAL PROTECTIVE MATERIAL FOR FOODSTUFF ON THE BASIS OF ANIMAL RAW MATERIAL**

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### **ABSTRACT**

**Main purpose of this paper is to obtain and estimate the real antibacterial activity of new preservative material – nano silver concerning to food production, in particular to a question of possible increase in periods of storage of meat production (boiled sausages). Many substances possessing antibacterial activity and promote the long preservation of food production. It was an interest to investigate some changes occurring in meat production under influence of known food preservative – sodium D-lactate, and also nano silver. The effect of influence of nano silver was estimated on the biochemical changes (contents of free amino acids), and also a direct estimation of antibacterial influence by microbiological tests.**

## **IMPACT OF LANTHANUM ON CRYSTALLIZATION OF BISMUTH-ERBIUM NITRATE**

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### **ABSTRACT**

**The work contains the results of study on solidification of double bismuth-erbium nitrate and impact of lanthanum on this process. The study defined crystal growth rate in lengthwise and crosswise directions, type and mechanism of salt crystal formation depending on solution concentration. Results obtained allowed making an assumption on a possibility to control the crystallization process within the investigated system, which is a necessary condition for creating combined materials with preset properties of structural and functional type. These are mesoporous mesostructured silicates.**

**DECORATIVE MORTARS BASED ON NANODISPERSED TITANIUM  
DIOXIDE**

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**ABSTRACT**

**An ultrasonic method for producing stable suspensions of nanoparticles of titanium dioxide, the strengthening characteristics of decorative mortars based on gypsum and cement binders with nanodispersed additive are studied. Nanoparticles reacting with the basic chemical elements of mortars act as crystallization centers. There is a decrease of porosity, therefore physical and technical properties of mortars are improved.**

**HEAT EFFECTS OF INTERACTION BETWEEN CELLULOSE  
AND VARIOUS POLAR LIQUIDS**

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**ABSTRACT**

**Interaction of cellulose samples with various classes of polar liquids (water, diluted and concentrated solutions of acids and alkalis, alcohols, polar organic solvents) was studied by method of microcalorimetry. The results showed that interaction of cellulose with the used liquids give exothermic heat effect – enthalpy. Heat of interaction of low polar liquids doesn't depend on crystallinity and affects only surface of the cellulose material. Some other liquids, methanol, water, diluted water solutions of acids and alkalis, as well as some polar organic solvents, are able to interact with non-crystalline domains of cellulose, and therefore value of the interaction enthalpy is directly proportional to content of these domains. The active organic liquids and concentrated solutions of mineral acids and alkalis show high exothermic effect of interaction and damage crystalline structure of cellulose.**



**ARTIFICIAL EXPLOSION OF SUN AND AB-CRITERION  
FOR SOLAR DETONATION**

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**ABSTRACT**

The Sun contains ~74% hydrogen by weight. The isotope hydrogen-1 (99.985% of hydrogen in nature) is a usable fuel for fusion thermonuclear reactions. This reaction runs slowly within the Sun because its temperature is low (relative to the needs of nuclear reactions). If we create higher temperature and density in a limited region of the solar interior, we may be able to produce self-supporting detonation thermonuclear reactions that spread to the full solar volume. This is analogous to the triggering mechanisms in a thermonuclear bomb. Conditions within the bomb can be optimized in a small area to initiate ignition, then spread to a larger area, allowing producing a hydrogen bomb of any power. In the case of the Sun certain targeting practices may greatly increase the chances of an artificial explosion of the Sun. This explosion would annihilate the Earth and the Solar System, as we know them today. The reader naturally asks: Why even contemplate such a horrible scenario? It is necessary because as thermonuclear and space technology spreads to even the least powerful nations in the centuries ahead, a dying dictator having thermonuclear missile weapons can produce (with some considerable mobilization of his military/industrial complex)—an artificial explosion of the Sun and take into his grave the whole of humanity. It might take tens of thousands of people to make and launch the hardware, but only a very few need know the final targeting data of what might be otherwise a weapon purely thought of (within the dictator's defense industry) as being built for peaceful, deterrent use. Those concerned about Man's future must know about this possibility and create some protective system—or ascertain on theoretical grounds that it is entirely impossible. Humanity has fears, justified to greater or lesser degrees, about asteroids, warming of Earthly climate, extinctions, etc. which have very small probability. But all these would leave survivors -- nobody thinks that the terrible annihilation of the Solar System would leave a single person alive. That explosion appears possible at the present time. In this paper is derived the 'AB-Criterion' which shows conditions wherein the artificial explosion of Sun is possible. The author urges detailed investigation and proving or disproving of this rather horrifying possibility, so that it may be dismissed from mind—or defended against.



**EVALUATIONS OF VERTICAL TRANSPORT OF ICE-FORMING  
PARTICLES PRODUCED BY GROUND-BASED GENERATORS**

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**ABSTRACT**

The study presents theoretical evaluations of concentration of ice-forming particles produced by ground generators up to heights where the particles can activate to crystals and contribute to cloud microphysical processes. Different mechanisms of particle ascent are considered. The evaluations show that particles generated by ground generators can reach levels lead of -5/-6<sup>0</sup> C isotherms with concentrations up to 10<sup>6</sup> particles/m<sup>3</sup>. According to the current concepts, this amount of ice-forming particles could be sufficient to apply surface generators both for purposes of precipitation enhancement as well as hail prevention. By regulating the duration, productivity, number and location of ground generators, one can increase the amount of seed particles at necessary height levels, which enables to regard ground particle generation as a tool for precipitation enhancement and hail prevention.

**PRODUCTION FRESH WATER BY EXHAUST GAS  
OF ELECTRIC AND HEAT PLANTS**

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**ABSTRACT**

A new, cheap method for the extraction of freshwater from the sea which is fundamentally distinct from all existing methods that extract freshwater from the sea water is proposed. This method uses the hot exhaust gas (smog) of industry (after production process, example, after gas turbine of electric generator) and sea water. By using the temperature difference productively, this method needs comparatively small energy input -- only for pumping water and air, not for heating or cooling. This new environmentally friendly method may be used at any point in the Earth located not far from any sea. There are three working versions: (1) Underwater heater and tube cooler; (2) Douche heater and douche cooler; (3) Underwater heater and underwater cooler. The installation also clears the exhaust gas from ashes and soot, sulfur dioxide (SO<sub>2</sub>). The water having the high concentration carbon dioxide (CO<sub>2</sub>) may be used for growing algae for biofuel and feed.



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**ACCURACY AND RESOLUTION CAPACITY OF MRL5 (Is) RADAR  
ORNITHOLOGICAL STATION AND ITS POTENTIAL DEVELOPMENT**

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**ABSTRACT**

**The paper presents the comprehensive assessment of the resolution capacity of MRL5 radar ornithological station developed in Israel. Theoretical calculations, as well as experimental testing and field experience enable the authors to evaluate the station's performance and to suggest new directions of its potential development.**