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## NANOTECHNOLOGIES IN CLOSING DESIGN

Student D. Shaduik, gr. BPD-16

Language and scientific supervisor K. Kugai  
Kyiv National University of Technologies and Design

**Purpose and objectives.** The purpose is to present some nanotechnologies in closing design. Objectives are to define concepts and peculiarities of modern design, to analyze the formation and main directions of nanotechnological design development in some countries, to study the history of nanotechnological design and describe some new methods in this sphere.

**Object of research.** The research deals with new discoveries in design of clothes.

**Subject of research** is retrospective and current state of nanotechnologies in design.

**Research methods.** To achieve this goal, the following methods were used: analysis, synthesis, comparison and generalization, systematization, classification and comparative methods.

**Research results.** Nowadays, there are textile materials, clothing of which, in the near future will automatically be heated, cooled, will maintain a certain temperature of the human body for extreme conditions, relieve fatigue or allergies, and repel electrical charges, dirt. Underwear with moisture absorbing cream; costumes, dresses which repel the liquid, and practically will be clean; some things will be able to treat wounds and infectious diseases, to control vital functions of the human body; find the way unfamiliar places; observe the behaviour of children; convert coats or jackets in mini computers.

These are the latest trends in the manufacture of clothing from textile materials, which have better properties due to the use of new types of raw materials, manufacturing and processing technologies. To realize similar and make reality is possible through integration into textile production of hi-tech technologies. The leading role is played by nanotechnology.

Today, the textile industry is introducing the production of nanofibers and final processing using nanotechnology.

Philips engineers have developed lingerie that monitors blood pressure and is part of a system monitoring vital user parameters. In addition to the parameters of blood pressure, the new device will be able to provide data such as body temperature, pulse rate and heart rate. All this information will be stored on the ROM of the device and regularly provide the doctor with this information. In case of deviation from the norm in one of the parameters, the device will signalize the user about this.

Materials with thermoregulation are already used by every sports companies such as Nike, Adidas. They sew T-shirts, jackets, trousers. Fabrics are ideal for physical exercises: for example, they are remove moisture from the skin surface; doing much exercise more enjoyable. In other words, after training your body is dry, and the T-shirt, on the contrary, wet. Or, for example, such a fabric protects from the wind: for winter jogging you do not need to wear a few thick sweaters. In general, such sporting materials are thought up in order to save normal body temperature under any conditions. In addition, they are often lighter than cotton, practically do not crease and do not require special washing conditions.

A few years ago, the famous designer Hussein Chalayan created the collection of dresses that could be monitored with a remote control. Things opened and changed shape – it looked like a show, absolutely fantastically. The development of special inclining to transformation materials are especially actively used for the military: they produce fabrics that vary in length depending on temperature environment.

The German designer Anke Domascu decided to offer consumers ecological clothing, which is completely made from milk. Such clothes improve blood microcirculation and allow you to regulate body temperature. In this direction, the designer from London Susanna Lee also works. She found a good way to create ecological clothing, especially without spending on natural fabrics – just



grow it. In such a simple, but scientific way, Suzanne Lee has already created a line of bags, several jackets of actual styles and even a whole collection of elegant things that are as tight as second skin.

The promising textile fibres of the future are polyamides fibres derived from lactic fermentation, which give them antiseptic properties. There are also purely chemical methods for the synthesis of lactic acid based on lactonitrile (a product of the production of acrylonitrile) or by the oxidation of propylene.

Replacement of existing polymeric materials of the past on biodegradable polymers will reduce greenhouse evaporation by 15-60%. For the manufacture of biodegradable polymers is possible to use biomass in the form of potatoes, corn, peas, beets, rice, and wheat instead of oil, gas, metals and plastics.

According to the program for the development of fibres and threads in 2011, FARMASH is developing a technology for the manufacture and processing of new modifications of fibres obtained from crazing polyester fibres – bactericidal, bicomponent, odorising, superfine – into innovative products with protective properties.

Textile products with protective features are knitted underwear, sportswear, overalls and clothes for the military. Current trends in the application of nanotechnologies in the field of textiles make it possible to improve its properties not with the help of nanomaterials, but also due to the final processing of nanoemulsions and nanodispersions. At the same time, the materials are provided with such properties as water and oil resistance, softness, non-incompatibility, antistaticity, heat resistance, dimensional stability, antibacterial effects, and the like.

The development of nanofunctional fibres was used in the manufacture of hygienic fabrics for lingerie. Several companies use these fibres to absorb odours for textiles such as socks, stockings, underwear, etc. For example, socks containing silver nanoparticles can minimize the smell of the legs. Nano-Tex is developing a new technology, known as Nano-Fresh, which allows the fabric to absorb sweat, quickly dry up and absorb the smell. Several other high-tech fabrics being developed will remove sweat, repel spots, provide massage and provide a fragrance.

In addition, antimicrobial processing of textile materials is currently underway, which can play an important role in protecting against a wide range of physical, chemical or biological threats.

Nowadays, in textile production of industrialized countries of Europe, Asia and America, priorities are changing – traditional textiles go to developing countries, and its place is occupied by “smart” textiles for medical, household, technical, information purposes, etc., for which high technology is used.

**Conclusion.** Most technological innovations in the design of fashionable clothes are endowed with unlimited potential, and the result of its implementation in the fashion industry is the development of new fashionable products with mixed improved features and properties. Today, textile and technical innovations are the transparency of clothing, the interaction of clothing and electronics, clothing as a means of transmitting information, changing the nature of materials (nanotechnology). New quality of textiles is the key to successful use of innovative developments by the society.

**Keywords:** the latest technology, textile and technical innovations, clothing design, nanotechnology.

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