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SMART TEXTILES IN LIGHT INDUSTRY AS A FAMILY OF ADVANCED NEO-MATERIALS

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Abstract. *Nowadays, electronic sensors and elements of wearable electronics are actively being introduced into clothing, which make life easier for people in their professional activities. In this regard, it is worth mentioning «smart fabrics» from the family of electronic textiles – a type of material that includes electronics and microchips. The article provides an overview of innovative technologies in the design of «smart clothes».*

Keywords: smart textiles, family of electrical materials, neo-textiles, industrial design, passive and active neo-textiles.

Nowadays, electronic sensors and elements of wearable electronics are actively being introduced into clothing, which make life easier for people in their professional activities. In this regard, it is worth mentioning «smart fabrics» from the family of electronic textiles – a type of material that includes electronics and microchips. The creation and production of electronic textiles is impossible without the use of digital technologies. Wearable electronics should be integrated into familiar everyday clothes, but at the same time a functional gadget that has the ability to charge itself, save, accumulate energy and ensure the implementation of useful functions, the autonomy of the device without the complications of additional loads for comfortable wear. These possibilities may serve as a justification for the relevance of further research.

Logically, this implies the formulation of the purpose of the work: analysis of textile materials and electronics, manufacturing technologies and applications of electronic textiles for everyday use. Based on the established goal, a number of tasks were identified: search and analysis of the results of scientific research on which the development of special materials is based; characteristics of a specially developed weaving technology that provides elasticity and the ability to integrate touchscreens, electronic devices, batteries, audio electrical devices into the main fabric, based on statistical research data to identify the scope of application of «intelligent textiles».

It is determined that wearable electronics is a class of devices that are worn on the human body and are usually designed for health monitoring, prevention, as well as for entertainment, visual effects, etc. [1, 2]. Currently, wearable electronics has become an integral part of many people's daily lives [3, 4] and its importance continues to grow [5].

The idea of wearable devices dates back decades, but it is believed that their development began with the advent of the first wristwatches. Over time, technological progress has made it possible to integrate various functional features into the watch, such as pedometers or message notification [6, 7].

Wearable devices include a variety of technologies and components. One of the key elements of wearable devices is a sensor that collects data about the user, such as heart rate, physical activity, blood oxygen levels and many others. This data is processed by the built-in processor, and the results are displayed on the screen or transmitted to a mobile device via wireless technologies such as Bluetooth.

Among the popular types of wearable electronics, one should highlight:

- Smartwatch: Provides the user with a variety of functions, including physical activity tracking, notifications, music, and even payment via NFC;
- Fitness trackers: Devices specialize in monitoring health and physical activity, they can track steps, heart rate and other parameters;
- Smart glasses: provide information in the form of holographic screens, which makes them incredibly convenient for receiving and interacting with information online;
- Sports devices: These devices include GPS watches that can be used for navigation and monitoring outdoor activities.

Despite advances in technology, the field of wearable electronics faces several challenges, such as battery life, data privacy, and design. However, with the development of technology, we can expect further growth of this industry. Wearable electronics is an exciting segment of the technology industry that has a significant impact on our daily lives. It provides new ways to monitor health, improve productivity, and develop the entertainment industry [8]. The future of this field is expected to be even more exciting with the advent of new innovations and improvements in existing technologies [9, 10].

Since wearable electronics is one of the most dynamically developing segments of modern technology, in the Russian Federation the direction of neo-textiles is recognized at the level of research and development, but it is not a busy market niche and represents a huge platform for development. The main need identified in this area is the creation of unique fabrics that visually do not differ from the usual materials, but have a number of significantly new functional features [11] that motivate people to use.

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ИССЛЕДОВАНИЕ ВЛАГООБМЕННЫХ СВОЙСТВ ТРИКОТАЖНЫХ ПОЛОТЕН ИЗ СЫРЬЯ БЕЛОРУССКОГО ПРОИЗВОДСТВА

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Реферат. Работа посвящена изучению трикотажа для термобелья из видов сырья производства Республики Беларусь. Проведены исследования относительного влагопереноса трикотажа. Выявлено превосходство по влагопереносу экспериментальных образцов трикотажа из белорусского сырья над зарубежными аналогами. Требуется дополнительное исследование.

Ключевые слова: одинарный трикотаж, хлопчатобумажная пряжа, полиэфирные нити, льняная пряжа, полиакрилонитрильная пряжа, термобелье.

На территории Республики Беларусь имеются предприятия, производящие сырье для текстильных материалов. Предприятие ОАО «СветлогорскХимволокно» специализируется на выпуске полиэфирных нитей. ОАО «Полесье» изготавливает полиакрилонитрильную пряжу. На предприятии ОАО «Барановичское производственное хлопчатобумажное объединение» выпускается хлопчатобумажная пряжа. Оршанский льнокомбинат изготавливает льняную пряжу.

Актуальна разработка новых текстильных материалов из отечественных видов сырья. Одной из перспективных групп текстильных материалов являются полотна для термобелья [1, 2, 3, 4].

Термобелье можно условно разделить на три группы: влаговыводящее, согревающее и комбинированное (влаговыводящее и согревающее). Влаговыводящее термобелье состоит из синтетических видов сырья, обеспечивающих высокие капиллярные свойства. Такие изделия применяются при высоком уровне физических нагрузок и относительно высокой температуре внешней среды. Для низкого и среднего уровня физических нагрузок и низкой температуры внешней среды предназначено термобелье согревающей группы, которое традиционно производится из натуральных видов сырья, например, шерсти мериносо. Комбинированное термобелье предназначено для среднего уровня физических нагрузок и относительно низких температур использования. Такие изделия имеют как минимум два слоя: прилегающий к коже слой состоит из влагоотводящих синтетических гидрофобных видов сырья (полиэфирные нити, акрил), а внешний слой – из натуральных гидрофильных (хлопчатобумажная пряжа, шерсть). Внешний слой может также включать в себя синтетические виды сырья дополнительно к натуральным. Внешний слой не соприкасается с кожей и впитывает влагу, отведенную от тела внутренним слоем [5, 6].