

## “PROSPECTS OF USING NANOMATERIALS IN ARCHITECTURE AND CONSTRUCTION”

**Achilova M. F.**

Sam. SAKU supporting doctoral student (Phd)

### ABSTRACT

Our goal is to develop proposals for the further improvement of today's architecture and to substantiate them scientifically. In the modernization of architectural complexes, it is about the creation of a unique project using nanotechnologies.

**Keywords:** nanotechnology, nanomaterials, solar panels, sensory packaging, design, aesthetics

Nanotechnology is actively entering our life. If ten years ago such developments were considered fantastic, now they are widely used in various fields. In the advanced direction of our time - in the field of architecture, aesthetic strength in the use of nanotechnologies, light, fire-resistant, and ecologically clean structural materials in design occupy a special place. The role of nanotechnology in bringing out today's eye-pleasing and unusual architectural projects and their aesthetic aspects is incomparable. The development of technologies in the construction industry is primarily aimed at improving the functional properties of the building, rather than introducing new building materials. This is evidence that nanotechnology has found its place in this field. Currently, engineers and scientists see the following prospects for the use of nanomolecular materials in construction:

- creating a foundation that self-regulates soil shrinkage;
- development of structural elements responding to damage or deformation;
- use of solar panels as closed structures;

Inventing coatings that are sensitive to people's mental and physical condition;

- creation of functional coatings;
- to increase the strength and reliability of buildings.

The most commonly used materials based on nanotechnology:

- nano concrete;
- nanogel;
- nanocoatings.

Nano concrete is characterized by high strength and long service life, according to experts, it can be up to 500 years. This material is actively used in the construction

of skyscrapers, large bridges, domes over nuclear facilities, etc. Nanogel is also widely used in construction due to its special strength and durability. As for nanocoatings, they have gained great popularity. If we talk about the field of architecture, then nanocoatings are used to protect buildings from external influences. Currently, the excellent properties of nanomaterials allow the use of new heat-insulating materials, paints, enamels, varnishes and many other products in architecture. A major breakthrough in the field of nano-coatings in architecture was imitating the effect of lotus leaves, which are completely untouched by water. The result is the National Grand Theater in Beijing, whose giant egg-shaped dome made of glass and titanium is treated with a nano-coating that does not get polluted or wet by precipitation.



#### Pekin National Grand Theater Building

Nanotechnologies in construction are mainly manifested in the creation of nanomaterials. The main direction in this field is the creation of various materials with a complex structure and specific strength or temperature properties, as well as the processes of self-organization of substances at the atomic and molecular level, which allows the creation of objects without external objects. And now, theoretical and experimental studies aimed at developing technological processes for obtaining materials, objects and structures are planned and implemented. Compared to their analogues, the difference between the materials is very large, that is, nanomaterials differ in their physical and mechanical properties.

The use of nanoproducts in architecture, especially in multi-functional public buildings, creates efficiency such as the formation of today's architecture, the use of cheap, light, strong materials that serve to increase the quality, as well as create comfort and convenience for the population.

### REFERENCES:

1. Цымбал М.В. Юшкевич Л.С. Свидетельство о государственной регистрации базы данных №2010620298, от 20 августа 2010 г. «Мультимедийные лекции по Основам нанотехнологий. Раздел «Нанотехнологии в строительстве»
2. Цымбал М.В., Тимошкова Е.С. Юшкевич Л.С. «Здание будущего» Всероссийская научно-практическая конференция «Управление инновационным развитием современных социально-экономических систем, Волгоград. - М.:ООО «Глобус», 2009 ISBN-978-5-9928-0095-1, с.102-106
3. Балабанов В. И. Нанотехнология. Наука будущего./ В. И. Балабанов. - М.: Эксмо, 2009. 4. Лучинин В. В. Введение в индустрию наносистем/ В. В. Лучинин//Нано- и микросистемная техника. - 2005.
5. Нанотехнологии в строительстве, научный интернет журнал, <http://www.нанобуилд.ру/>, 2008 - 2011 год.