

# Discussion on the Application of Inorganic Nonmetallic Materials in Building Engineering

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**Abstract:** In recent years, with the continuous development and progress of science and technology and economy, more and more people flood into cities, which leads to the gradual acceleration of the development of the construction industry, the number of buildings is also increasing year by year, and the development of the construction industry will need the support of inorganic non-metallic materials. At present, the research on inorganic non-metallic materials is more and more closely related to the construction industry. Because inorganic non-metallic materials usually have excellent properties that other traditional materials do not have, they can be widely used in construction engineering and play a great role in promoting the development and progress of social economy in the future. In this paper, the inorganic non-metallic materials and their classification are introduced firstly, and the application and advantages of inorganic non-metallic materials in construction engineering are expounded, and the application evaluation of inorganic non-metallic materials in construction engineering is analyzed. Finally, the future development of inorganic non-metallic materials in construction engineering is discussed.

**Keywords:** Inorganic Nonmetallic Materials, Construction Engineering

## 1. Introduction

Inorganic non-metallic materials are essential in national progress and social development. Inorganic non-metallic materials are widely used in construction engineering because of their characteristics of high strength, fire prevention and non-toxicity. In the process of building engineering in China, more and more buildings begin to use inorganic non-metallic materials as construction materials, but the elements of inorganic non-metallic materials are changeable, and different materials have different advantages and characteristics due to their different composition. Therefore, we should analyze the construction and use of inorganic nonmetallic materials in construction engineering, so as to better promote the development of construction engineering.

## 2. Overview of Inorganic Nonmetallic Materials

In the construction of architectural engineering, traditional inorganic non-metallic materials are indispensable, but with the progress of science and technology, people have begun to pursue a higher quality of living environment, so the emergence and research and development of new inorganic non-metallic materials is the goal of modern new development of the industry. At the same time, it is also an indispensable material for arming national defense system with advanced science and technology and solving life science with scientific and technological methods. Inorganic non-metallic materials can reduce energy consumption in the process of being used, so that the construction project can achieve the effect of building energy conservation. Its basic properties are mainly reflected in high melting point, not easy to melt, not easy to be damaged, good oxidation resistance, etc. However, inorganic nonmetallic materials also have some disadvantages when they are used in construction projects, such as easy deformation and poor toughness.

### **3. Classification of Inorganic Nonmetallic Materials**

#### **3.1 Traditional Inorganic Nonmetallic Materials**

##### **3.1.1 Gelled Material**

Cementitious materials are almost everywhere in the construction industry, among which lime and gypsum are widely used in the construction of construction projects. The first cementing material used by humans is lime, which is often used in the construction process of construction projects. Among building materials, lime and limestone can react with different substances to produce different materials, so they are also important raw materials for many buildings. Lime has good water retention and plasticity, so it is often used in construction engineering to improve the phenomenon of serious bleeding of mortar in the construction process, so as to solve the shortcomings of cement mortar. Lime shrinks more when the environment is dry, so do not use lime alone except for paint.

##### **3.1.2 Ceramic**

The stoma of pottery can absorb certain moisture generally, its section is not smooth, and the porcelain body is dense, the ability of stoma to absorb water is very low. With the development of economy and science and technology, the kinds of ceramic products are also slowly increasing, its microstructure is composed of different components, the proportion of components according to the different varieties and there are differences. Recently, more and more attention has been paid to the basic research related to the development of functional ceramics technology. Compared with ordinary ceramics, ceramic materials have high strength and good insulation performance, but it also has the problem of high brittleness, which is one of the main aspects to improve its performance in the future.

#### **3.2 New Inorganic Nonmetallic Materials**

New inorganic nonmetallic materials are widely used in building engineering, such as thermal insulation materials and silicate materials.

##### **3.2.1 Heat Preservation Material**

Insulation materials can keep indoor and outdoor temperatures consistent, in different environments can play a role in temperature balance. In construction engineering, because the insulation material contains a certain number of holes, resulting in its ability to absorb the sound wave generated by the vibration of the object is good, so it can be widely used in the construction of construction engineering. In the construction of different construction projects, can overcome the wall fracture, mildew, peeling, water leakage and other problems. And its high degree of safety, good randomness, can also effectively overcome the material shedding deformation, temperature difference is too large and other major problems.

##### **3.2.2 Silicate Material**

The importance of silicate in inorganic materials is self-evident, because the hardness of this kind of material is very strong, so it is widely used in construction engineering. Due to destruction of silicate can resist the corrosion of the surrounding medium, so in the construction engineering construction industry use is more, silicate at certain temperatures have the ability to bear ultimate load per unit area, its corrosion resistance compared with other metal material has stronger, and in the construction industry has been gradually take the place of traditional materials for use. Silicate materials can form a strong gel structure, can better improve the thermal insulation effect. Silicate materials can provide better application materials for building construction.

### **4. Application and Advantages of Inorganic Nonmetallic Materials in Construction Engineering**

In recent years, the development speed of China's construction industry is gradually increasing, but at the same time, some problems are gradually found, the shortage of energy and building materials is the most important problem, but inorganic non-metallic materials can effectively solve this problem, because of its good thermal insulation performance. The use of inorganic nonmetallic materials in the construction process of building engineering can enhance the insulation of the building and prolong the use of the building, and can effectively prevent the building from being directly exposed to the external environment, and can reduce the damage and corrosion of the building from the external environment. In recent years, in the construction of buildings, inorganic non-metallic materials are often used in the

masonry materials of walls and the thermal insulation performance of buildings.

#### ***4.1 Application in Wall Masonry***

Block is a new type of wall building material developed in China, and its varieties and parameters are many, among which small concrete block and autoclaved aerated concrete block are used more in reality. Because of the large volume of block, common brick is often used in China's practical application.

Among many masonry materials, small hollow concrete blocks made of inorganic non-metallic materials can be used in high-rise buildings, large span, wall retaining walls, Bridges, flower beds and other kinds of earthquake intensity 8 degrees and below the construction project. Due to the high strength of small hollow concrete blocks, walls built with this block are less vulnerable to earthquake and fire. At present, in the process of building masonry, China has abundant raw material resources for this kind of material, so the use of this kind of block will not pollute the environment and can reduce expenses, and can provide guarantee for the development of construction engineering. But in the use of the block should also be processed through the correct means, otherwise if the wall leakage and other problems, will also bring a lot of losses to all aspects.

#### ***4.2 Application in Building Insulation***

Inorganic nonmetallic materials can be used as wall insulation materials during building construction. In recent years, inorganic nonmetallic materials have been used in the thermal insulation engineering of buildings, which can improve the thermal insulation ability of buildings in extreme weather and reduce the loss.

Rock wool, diatomite, foam glass and other materials with better insulation performance are often used in the construction process of construction engineering. Different materials have different properties. Flocculent is among them, rock wool fiber, rock wool products easy to obtain raw materials, production of the energy loss is low, the fiber is longer, chemical durability, water resistance and acid and alkali is better also, the cover over the surface of the building, can enhance the heat preservation of building, and the ability to protect the buildings from the external environment of damage; Diatomite is a biochemical sedimentary rock with a large pore volume. If it is powder, it can absorb water. Diatomite has a strong heat resistance ability. Foam glass, also known as porous glass, is not easy to deformation, non-toxic, long use time, stable chemical properties, can be resistant to most of the organic acid, inorganic acid and alkali, its heat insulation performance is stable in low temperature, wet environment. Foam glass is often used as roof insulation board, external wall insulation board, and some will be used as ceiling board material and pipe insulation material, and widely used in construction engineering.

In general, with the continuous progress of global science and technology and the accelerating process of industrialization and technology, inorganic non-metallic materials are more and more used in the process of construction engineering. The use of the material in the construction of wall masonry and insulation engineering construction, can improve the thermal insulation capacity and overall stability of the building, and can strengthen environmental protection, prevent environmental pollution.

### **5. Application Evaluation of Inorganic Nonmetallic Materials in Building Engineering**

Inorganic nonmetallic materials play an important role in innovating and developing new industries, transforming traditional technologies, saving resources and developing new energy resources. Inorganic non-metallic materials to a is defined as "project" of architectural engineering, for example, in the design of the construction projects, to all aspects of its construction has taken a different approach to save energy, through a year's time, under the different energy saving scheme, the construction compared with the traditional energy saving measures, This project can reduce the consumption of more than 20 tons of standard coal every year, and the total energy saving rate can reach more than 25%. It can be seen that the "inorganic nonmetal project" has achieved great success in the hope of using different energy saving schemes to save energy. Therefore, it can be concluded that the application of inorganic nonmetal materials in construction projects will be more energy saving than traditional materials.

Inorganic non-metallic materials in our country, in the process of gradually replace the traditional

material occupies an important position, they have been as wall masonry structures, insulation components, wear resistance, corrosion resistant parts into the construction industry, chemical industry and other traditional industries, promote the upgrading of products and building materials industry technical transformation, improve the progress and development of construction industry.

## 6. Future Development of Inorganic Nonmetallic Materials in Construction Engineering

Although the output of the four categories of building materials in China is large, they are not strong points in China. The weak point is the development capacity of the manufacturing industry of new building materials. For many years, it has been relying on imported technology, so it is necessary to strengthen the ability of continuous innovation and creation, and inject new energy into the development of the construction industry. Inorganic non-metallic materials have a wide range of materials to choose, but their production technology is not mature enough, environmental pollution and excessive energy consumption often occur in the production. But with more and more people pouring into this industry, this problem can be effectively solved in the future.

At present, with the advance of science and technology, materials have begun to be applied in more different architectural fields. Inorganic non-metallic materials are very important for the progress of construction engineering, and are of great significance in ensuring the quality of engineering, thermal insulation requirements, and realizing the goal of green environmental protection.

## 7. Conclusion

With the accelerating process of global science and technology, vigorously advocating the development of green environmental protection is the top priority, and the production, research and development of inorganic non-metallic materials is an inevitable process to further strengthen the green environmental protection. Therefore, people should take a rigorous attitude towards the development trend of inorganic non-metallic materials in construction engineering, better amplify their performance advantages, so that they can be better applied in construction engineering, so as to promote the continuous development and progress of China's construction industry.

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