

## **BAZALT FIBER AND ITS COMPOSITIONS: GENERAL VIEW**

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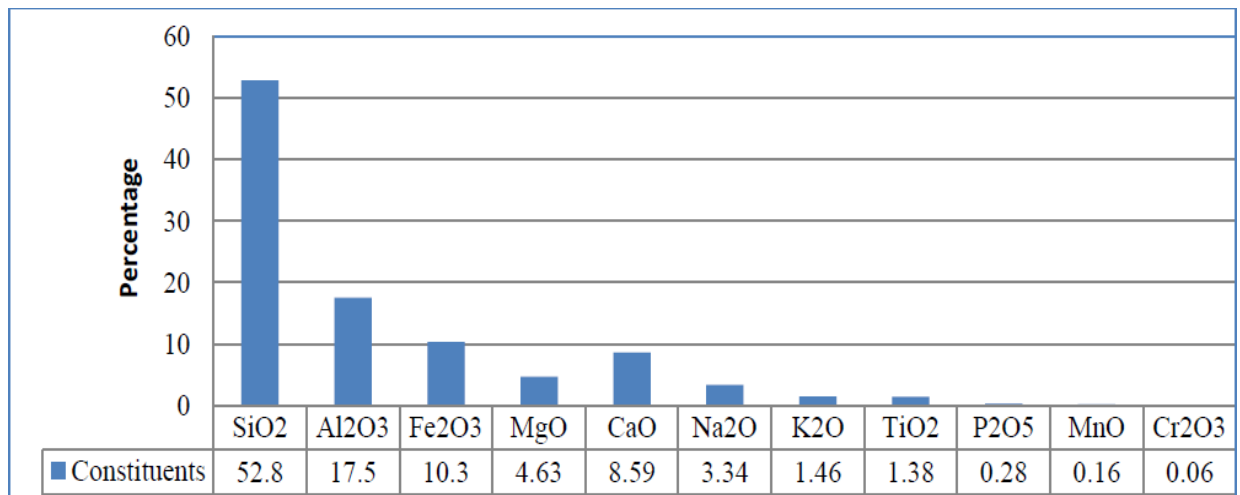
**ANNOTATION.** This article examines the chemical composition, mechanical properties and durability of basalt fiber. Basalt fiber properties such as temperature change and adhesion are also discussed. In terms of cost effectiveness, basalt polymer is better than carbon fiber reinforced glass polymer, and compared to glass fiber reinforced glass polymer, it has better strength and has become a good alternative to other fiber materials. Basalt polymer has high flexural strength and better adhesion compared to glass polymer, the mechanical and thermal properties of basalt polymer decrease significantly with increasing temperature.

**KEY WORDS.** Adhesion, "Basalt fiber reinforced basalt polymer", basalt fiber, bond characteristics, flexural strength, tensile strength.

**INTRODUCTION.** The compressive strength of concrete is higher than its tensile strength, so we need to provide steel reinforcement to increase the properties of reinforced concrete, which increases the strength and durability of the structure. When conventional steel reinforcements are provided in concrete structures, they corrode the structure and thereby reduce its strength. Therefore, the need to approve the use of natural fibers in polymer reinforcement is widespread. Today, the production of durable and environmentally friendly material is widely developing. One of these materials is natural fibers in polymer-

based compositions. These materials are produced by combining high-strength, thread-like structures with a polymer. The result is a strong material with high strength, but light, that is, one kilogram of basalt reinforcement is equivalent to 9.6 kilograms of steel. The strength and stiffness properties come down to the fiber portion, while the polymer holds the fiber in place, which is known as Fiber Reinforced Polymer. Today, polymer composites are usually reinforced with glass fibers. has high modulus, high strength, and shows good bonding to various polymer networks.

**COMPOSITION OF BAZALT FIBERS.** It is rich in Mg, Ca, Na, K, and Fe oxides, with traces of aluminum oxide, and the crust is 33% basalt, becoming an abundant mineral. Table 1 and Figure 1 show the chemical composition of basalt, but it may vary according to topographical distribution [11]. Chemically, these fibers are composed of plagioclase, olivine, pyroxene and clinopyroxene minerals.

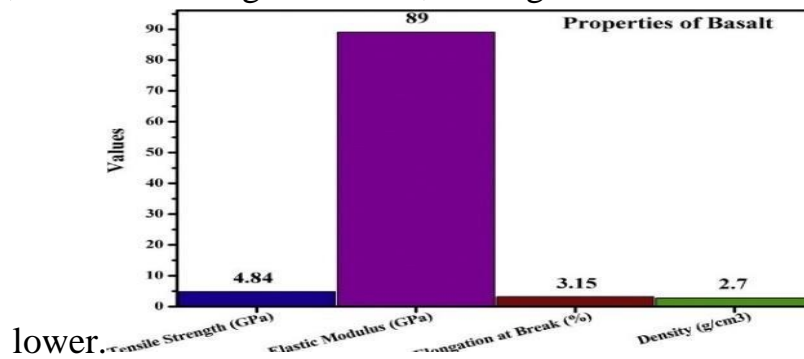


**Figure 1. chemical composition of basalt fiber.**

**CHARACTERISTICS OF BAZALT FIBERS.** Resin hardness, degradation properties, and crack propagation are factors that affect corrosion resistance. The complete mechanism of fiber decomposition is not fully understood, but structural and morphological changes occur in basalt under the influence of unfavorable environment for a long time. For a short time, basalt has chemical stability compared to other composite materials, so it is widely used in the fight against chemical corrosion. Basalts are more stable than glass in salt solution, especially in water, but they show less stability in strong acids. The complete loss of tensile strength in alkaline solutions is due to the deepening of the fiber over a large area. The most important reason for the loss of tensile strength in

acid solutions is the damage or change of the chemical components of the fibers.

For basalt, the loss of weight in alkali, boiling water and acid is also much



**Figure 2.** Mechanical properties of basalt fiber.

**SCIENTIFIC NEWS.** This article examines the chemical composition of basalt fiber, and discusses chemical resistance, thermal stability of BF, and reviews the properties of BFRP as a replacement for traditional steel through various properties that distinguish it from GFRP and CFRP. .

According to the above study, we observe that CFRP composite is the best material in the construction industry due to its high stiffness and strength. The strength of carbon fiber is much lower and as a result the resistance to damage is low, but if BFRP is used, these problems are solved because it has high damage resistance and good energy absorption. When tensile, flexural and compressive tests were conducted on BF reinforced plastic and GF reinforced plastic, comparing the results, it was found that basalt has better compressive and flexural strength than glass fiber. It can also be said that the increase in length and amount of basalt in R.C.C increases the cracking resistance, elastic modulus and ductility of concrete. When the fiber was tempered at different temperatures, it showed an increase in the tensile strength of the fiber when it was exposed to 300 C for 1, 15 and 60 minutes.

Adhesion tests showed that the final mechanical properties of the composite are affected not only in the off-axis direction, but also by the bond between the fibers and the matrix parallel to the fibers. When basalt fiber is coated with silica, we see a significant improvement in the mechanical properties of basalt by 5-25%.

**CONCLUSION.** This review examines the properties and performance of basalt fiber and basalt fiber reinforced basalt polymer as an alternative to traditional steel and other composite materials. Basalt showed the most effective results in an acidic environment. Reviews of various experimental data show that basalt polymer resists chemical attack better than glass polymer in acidic and

saline solutions. Alkali resistance, thermal stability of basalt fiber, as well as bending strength, temperature change and viscosity of polymer reinforced with basalt fiber are studied. Basalt composites showed higher tensile strength when exposed to high temperatures for different time periods than glassy polymer. Adhesion between basalt fiber and its composites is better than carbon fiber and its composites. The initial price of basalt fiber depends on its chemical composition and the quality of raw materials, which leads to the formation of various types with different mechanical, thermal and chemical properties. Widely used in the infrastructure and automotive industry, basalt fiber can be the material of the future at a low cost.

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