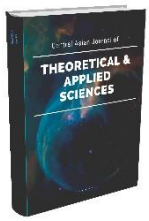

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The Future Vision of Polymer Composition Materials

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Abstract: *Over the last 10-20 years, polymer composite materials have been widely used in various sectors of the economy. Many polymer composite materials are used effectively in various design works (decoration of car, aircraft salons), new constructions, as exterior cladding of buildings, interior decoration of buildings.*

KeyWords: *polymer, polymer composite materials, kevlar, polybenzothiazole, polyethylene, polyvinyl alcohol, armirlan, matrix.*

INTRODUCTION

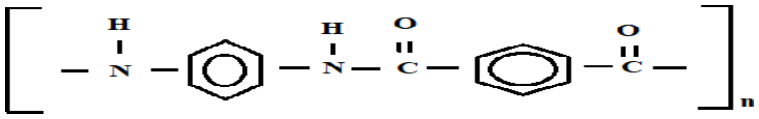
People live in a human consumerism society, they always try to meet their daily needs including food and clothing. To meet these needs, people apply different materials and substances. Depending on the stages of practical use of these substances, human society divides these periods into periods such as the age of stone, the epoch bronze and the period of iron. The substances that people use today is mostly polymer. Thus we can call today's era aster polymer. In fact, most of the substances used in both food and clothing are artificial polymeric materials. In addition, more than half of the products of the furniture industry, polymer composite materials used in automobiles and aircraft, have become so abundant that we can not imagine life without them **[1].** Especially in the field of construction and design, it is difficult to imagine the exterior design of doors, frames without polymeric materials.

There are lots of questions regarding the origin of this very precious material. what is a polymer composite material and how is it structured? It will take a long time to answer this question.

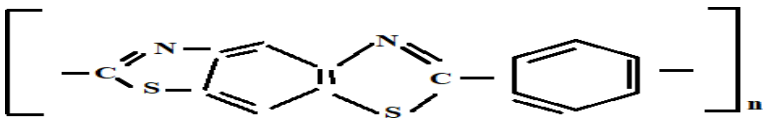
Artificial composite materials were used in the early stages of human development. This is not exaggeration. In ancient Egypt, boat builders mixed reeds with various bitumen oils to make light boats and use them in practice. In addition, the mummification of the bodies of the deceased king and his descendants was wrapped in ribbon-soaked cloth soaked in tar bitumen. These traditions from the distant past indicate that the history of modern polymer composite materials goes back a long way.

Demand for high-strength, low-weight materials is growing day by day especially in the spheres like modern aerospace, space rocketry, military shipbuilding, and automotive. This requires the creation of new high-strength, lightweight and comfortable materials that are easy to use. That is basically because of the development of these very spheres. The lightness and strength of polymer composite materials are better and more prefereable than metal alloys, some of which are higher quality than them. More specifically, polymer compositions are better than for example, aluminum and titanium alloys.The properties of polymer composition material depend not only on the properties of the polymer materials used as the matrix, but also on the properties of the fibrous materials used to increase the strength of the reinforcement of this matrix. Polymers used as fibers can be divided into rigid chains and flexible chains. Examples of rigid chain polymers are polyparaphenylentereftalalim. They are commercially known as kevlar and polybenzothiazoles **[2]**.

- kevlar

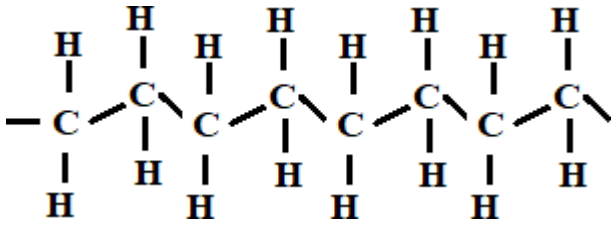


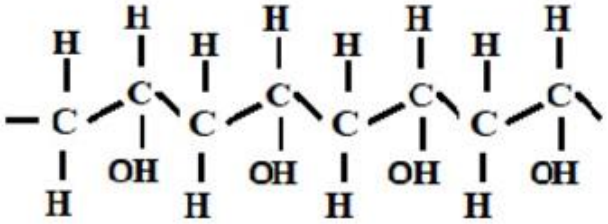
- polybenzothiazoles



Examples of chained flexible polymers are polymers such as polyethylene and polyvinyl alcohol.

- polyethylene





- polyvinyl alcohol.

Solid-chain polymers tend to orient in a certain direction at high temperatures. Therefore, in the reinforcement of such polymers, the method of processing by heating is used.

When stretching flexible chain polymers, they are used to stretch, so as not to damage the chain.

Materials for making polyethylene armor can have high strength. However, they also have significant drawbacks, such as low operating temperatures around 100 ℃ and poor adhesion to most polymeric materials.

Although fibers made of polyvinyl alcohol are structurally close to polyethylene fibers, they can withstand very high temperatures up to 200 ℃ and have good adhesion properties. They can be explained by the appearance of chemical defects.

PKMs, also known as organoplastics, are based on organic polymer fibers and are widely used in fields such as aerospace and rocketry. They are also used as personal protective equipment in the manufacture of bulletproof vests and helmets.

In order to optimize and use a wide range of properties of reinforced plastics, combinations of different fibrous polymeric substances in single-matrix materials are used in practice. This helps to increase their durability and heat resistance at the same time **[3]**.

Selecting a matrix for the PKM is one of those important issues. This is because the matrix causes different polymers to interact with each other, resulting in the formation of a monolithic structural material in the matrix.

The several parameters of the matrix, such as strength, plasticity, fracture and breakage, adhesion, are also very important for the implementation of the specific properties of the fibers in practice. PKM temperature resistance, resistance to external shocks, water and atmospheric moisture resistance, chemical resistance and other properties are determined by the polymer matrix and phase boundary properties. In addition, their properties depend on the technological processes of formation of PKM, the time of solidification kinetics, viscosity and pressure during processing, the state of the reinforcement process.

In recent years, PKMs have been widely used in construction. Such colorful materials are used in practice to decorate the exterior and interior of buildings. Thus, the creation of polymer composite materials, the study and application of their properties is becoming one of the main areas of modern materials science.

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