

The Development of Polymer Materials and the Current Situation of Their Use

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Abstract

With the rapid development of science and technology in China, the development of polymer materials industry also has a broad development prospect. As one of the four major research directions of materials, polymer materials have been playing an important role in industry and daily life. Facing the rapid development of science and technology, polymer materials must keep pace with the times and seize the opportunity to achieve their own sustainable development. Polymer chemical materials, in civil, scientific research, medical, commercial and other specific applications, have become an irreplaceable and important material. Therefore, in order to realize the effective use of polymer chemical materials, researchers need to combine the latest science and technology, production and preparation process, and continuously make in-depth research on relevant chemical materials, further improve the performance quality of materials, and better play the value of materials.

Keywords

Polymer Materials; Development Trend; Use of the Current Situation.

1. Overview of Polymer Materials

Polymer materials, also known as macromolecular materials, mainly consist of small units as basic units and a large number of repeated connections. Due to the large number of basic units, polymeric materials usually have a large molecular weight. The basic units are usually interconnected by polymerization. By source, they can be divided into natural and synthetic polymeric materials. Natural polymers are polymeric materials that are found in animals, plants and living organisms in the form of natural fibers, natural resins, natural rubbers and animal gums. Synthetic polymers are mainly plastics, synthetic rubbers, synthetic fibers, adhesives, coatings and polymers with other functions. Polymer materials have many excellent properties: in terms of physical properties, polymer materials have the characteristics of light specific gravity, high strength and good wear resistance; in terms of chemical properties, polymer materials have the characteristics of stable chemical properties and excellent corrosion resistance. The importance of "multi-functional, light and strong" polymer materials is becoming increasingly prominent and developing rapidly.

2. The Development Trend of Polymer Materials

2.1. Polymer Materials Contribute to the Development of Environmental Green

Compared with other materials, polymer materials have obvious defects in existing applications, namely, they cannot be degraded, and to a certain extent, they can cause some harm to the environment. In the process of research, development and production of polymer materials, people only pursue the performance and function of materials one-sidedly, ignoring

the need of consuming large amount of energy and resources as well as environmental pollution during the production, use and waste of materials. Green polymer material is a kind of environmental protection material. It makes full and rational use of resources and energy, and applies the overall strategy of preventing environmental pollution continuously to the whole process of production and the whole process of product life cycle in order to reduce the harm to human beings and the environment. Green polymer materials include polymer materials themselves, application and disposal. The former refers to the harmlessness of polymer synthesis and its friendliness to the environment, while the latter refers to the synthesis and use of degradable polymer materials, and the recovery and recycling of environmentally stable polymer materials. At present, green polymer materials have made many remarkable achievements in the selection of polymer monomers, new synthesis methods, product application and waste recycling, but it is difficult to completely replace the traditional polymer production process with new processes or new green polymer products in a short period of time.

2.2. The Development of Composite Polymer Materials

With the progress of science and technology, machinery, industry, aviation, medical and other industries have put forward higher requirements for polymer materials. A single polymer material can no longer meet the comprehensive requirements of industrial development. Therefore, the future development of chemical polymer materials is bound to show composite characteristics. At present, the composite polymer materials in China's advanced industry have achieved very great development and application significance, such as direct energy-saving polymer materials, which can be used as structural thermal insulation coating or exterior wall construction materials with strong thermal insulation effect, and have good fire and water resistance, good chemical stability, low expansion rate with long life and other characteristics. Some commonly used thermal insulation polymer materials for exterior wall construction, they are: phenolic polyurethane and its related composite materials with polymer coating. They can effectively meet the reliability and heat insulation effect of construction works, but also facilitate the construction. In addition, such as light functional polymer materials, using the advantages of material transmission and refraction of light, the development of photoelastic materials. At present, China's aerospace industry continues to move forward, and the degree of demand for composite polymer materials is gradually increasing.

2.3. The Functionality of Polymer Materials is More Prominent

With the progress of science and technology, the development of polymer materials pay more attention to functionality. High performance refers to the improvement of material preparation and material processing to further improve the high performance of polymer materials, such as high mechanical strength, high corrosion resistance and high wear resistance, so as to realize the application of polymer materials in the environment with high performance requirements. High functionality refers to the continuous development of polymer materials with a variety of composite functions, to achieve the diversification of functions and composite, to achieve "multi-purpose". Different industries have different requirements on the functionality of polymer materials in the process of development. Different industries, combined with the actual development of the industry, continue to give polymer materials with higher functionality, in terms of strength, toughness and other specific index requirements. For example, polymer-modified mortar with fast-setting, fast-hard, early-strength, high-strength, micro-expansion and wear-resistant multi-function. It can be widely used in emergency repair and reinforcement of roads, bridges, foundations, industrial, civil and military projects. It can be used for emergency repair and reinforcement of roads, bridges, foundations, industrial, civil and military projects, and it can be used to resume traffic and production in a few hours after

repair. It can also be used for anchoring, seating and secondary grouting of foot bolts in equipment installation.

2.4. The Development of Intelligent Polymer Materials

The intelligent application of polymer materials has become the focus of the current industry development. Intelligent polymer materials is a relatively new development direction in the field of materials. Intelligence refers to the realization of the life function of polymer materials, that is, they can change with the changes in the environment. For example, the shape of polymer materials with memory function can change according to the change of external conditions, and can even sense the change of ambient temperature and brightness and adjust accordingly; water-soluble polymer materials can realize self-dissolution in aqueous solution and have good adhesion and lubricity. The intelligence of polymer materials is mainly reflected in the self-healing and self-diagnostic ability of materials, which has a good development prospect. At present, intelligent materials research is carried out in many fields, such as automotive industry, medical industry, construction industry, etc., and a series of results have been achieved. Some of the intelligent materials have already begun to move from the laboratory to production practice, such as some of the cars have been applied to shape memory materials, making it more in line with human behavior and driving habits, providing a comfortable driving environment.

3. The Main Application Status of Polymer Materials

3.1. The Use of Polymer Materials in Industry

The application of polymer materials in real life is firstly reflected in the large-scale application at the level of mechanical industry. The application of polymer materials in the production of machinery industry has a strong alternative role, changing the bad problems that existed in the application of materials in the manufacturing of machinery industry in the past. In the past, in the construction of buildings, steel pipe as an important construction material, it is not only used as a support structure, but also used as a downpipe, which not only brings great inconvenience to the actual construction, but also seriously causes the waste of steel pipe material. Then, polymer materials applied to the actual construction of buildings, instead of the steel pipe materials used in the past, polymer materials due to its form and weight and other aspects of the advantages of the change of the previous mechanical operation production operation bulky and high consumption of the operation mode, for the control of industrial production production of the cost of inputs and so on the overall play a very important role in promoting. The application of polymer materials in industrial machinery is more common, and has a strong economic. Commonly used in industrial machinery, important parts of machinery, such as bearings, gears, etc., is often the use of precious metals as wear and tear, a relatively serious waste of resources, and non-ferrous precious metals have a high degree of wear and need to be replaced on a regular basis, but the use of composite polymer materials instead of non-ferrous precious metals, not only can reduce the wear of important parts of machinery, but also can effectively extend the service life and reduce the cost of use. And polymer materials are widely used in the electrical industry in the dissemination and transportation, with corrosion resistance and electrical and magnetic conductivity characteristics. In the field of communication, the demand for polymer materials is high, and the performance requirements of the materials are also relatively high. The application of optical functional polymer materials can be more widely used in the communication in the propagation, also used in the communication industry facilities and equipment, in electromagnetic aspects, the polymer magnetic materials are more widely used, further expanding the application of polymer materials in the field of electrical industry. At present, composite polymer magnetic materials have gradually replaced the traditional natural magnets in the development of the electrical

industry, with stronger hardness and toughness, and more plasticity, to achieve the design requirements of one-piece molding.

3.2. The Use of Polymer Materials in Agriculture

The application of polymer materials in agriculture is second only to the industrial field, and has now become an essential material in agricultural production and life. With the continuous development of agriculture, the use of greenhouses and plastic films in the process of modern agricultural production is becoming more and more common. Most polymer materials have good water permeability and air permeability, and can play a good role in preventing mosquitoes and insects, so they are very suitable for the production needs of the agricultural field. In addition, polymer materials also play a good role in seed selection and breeding in agriculture, in the treatment of seeds. By physically wrapping the seeds with dry and wet polymeric film-formers, it is possible to coat the seed surface with agrochemicals to prevent pests and diseases and improve seed germination. Mixing and pelletizing of seeds and polymer materials can improve the appearance and shape of seeds and improve product quality. The realization of mixing and pelletizing with agricultural seeds not only improves the efficiency of agricultural seeding, but also effectively reduces the probability of pests and diseases in seeds. In addition, the lifting ropes used in the current fishing operations and production work of lifting workers are basically polymer materials. Moreover, in the long-term research and development, many people found that mixing polymer materials with agricultural seeds and so on can not only improve the survival rate of seeds, but also lay an important foundation for the later sowing work.

3.3. The Use of Polymer Materials in Medicine

The application of polymer materials in real life is also highlighted in medicine, which gives full play to the high biological activity of polymer materials and their wide range of material properties, and the application of polymer materials in medicine is also the earliest aspect that highlights the advantages of polymer materials application. Polymer materials have begun to try to replace some of the organs of the human body, and great progress has been made in the development of artificial organs. Many artificial organs are made of polymer materials with strong fusion properties, thus reducing the human rejection reaction brought by such organs during transplantation and improving the probability of patients' recovery after surgery. Secondly, by introducing degradable polymer materials and designing new medical equipment tools, we can effectively improve the medical system and solve many clinical medical problems. At the same time, polymer materials have good physical and mechanical properties and can achieve the effect of sterilization resistance. In the process of medical device preparation, they can be processed into various forms of finished products with low cost of construction and low content of heavy metals, which will not cause material surface calcification. In practical application, it needs to be selectively incorporated according to clinical needs.

4. Conclusion

The application of polymer materials in practical life has very important advantages, the application of polymer materials in the field of medical care, industrial production and agricultural production has greatly compensated for the shortcomings of the previous material applications, on the basis of giving full play to the advantages of polymer materials, the future application can be aimed at the development of innovation in areas such as intelligence, green, performance and functional improvement, and the application of composite polymer materials Trend, to promote the application of polymer materials continue to expand, while enhancing the application of polymer materials, to provide production and life to facilitate the use of conditions. China is in the stage of rapid development, and will enter the stage of

industrialization and perfection of polymer chemical materials. Under the conditions of modern technology development, materials belonging to the field of materials and polymer materials research and development should receive more attention. The future development of society, the wide application of polymer materials can make people's life easier and produce higher social returns. The value of polymer materials should be recognized, and the research and development of polymer materials should be actively carried out to maximize the use of polymer materials and promote the progress of human social development.

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