

# Influencing Factors and Optimization Approach of the Industrialization of New Materials

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**Abstract:** The new material industry is an important part of the high-tech industry, the realization of new material industrialization is an important way to promote the rapid development of new material industry. Composite material gets energy saving and environmental protection performance, which is applied in accordance with the requirements of green development, in addition, with the development of economy, the traditional energy reserves is decreasing, the composite materials have great alternative space to take market demand, thus promoting the development of the industry.

## Introduction

New materials are those that are newly developed or are being developed, which are better than traditional materials. New materials closely linked with information, energy, health care, transportation, construction and other industries, not only includes magnetic materials, etc., but also includes a new energy source that is closely integrated with energy. Compared with traditional materials, the added value of the new materials industry with technology intensive, high investment in research and market of international strong features and wide application range and good development prospects, which is the typical high-tech industry, the level of R&D and production industry scale has become an important symbol to measure a national economic and social development, the progress of science and technology and national defense strength. Application of new materials is very extensive, its development mainly includes two aspects: one is the development of new molding technology and processing method, synthesized or prepared with high performance or new materials with special functions; two is the development of traditional materials, make great improvement of traditional materials.

Composite materials and metals, polymers, ceramics are known as the four major materials. Today, a country or region of the composite material industry level has become a measure of its technology to one of the signs of economic strength, advanced composite materials is a source of national security and national economic competitive advantage. In the future development, only the composite material probability is likely to improve in the future.

After the end of the 1960s, high-performance composite materials based on resin as matrix are used for aircraft structures, and then gradually into the industry in other areas. At the end of 70s developed with high strength and high modulus carbon fiber and heat resistant ceramic fiber and metal composite, especially the fish light metal composite, the formation of metal matrix composites, resin matrix composite overcomes poor thermal conductivity, etc., which has been widely used in aerospace and other high-tech fields. In 80s, the ceramic composite materials is coming. Composite materials have been paid more and more attention because of their

characteristics. At present, the annual production of composite materials in the world has reached about 5500000 tons, with an annual output value of more than \$130 billion, if the European and American military aerospace high-value products included, its output will be more amazing. From the application point of view, composite materials in the United States and Europe are mainly used in aerospace, automotive and other industries. In 2000, the amount of composite materials used for auto parts reached 148 thousand tons, and the amount of composite materials used in Europe was estimated to be up to 105 thousand tons by the year of 2003. In Japan, composite materials are mainly used in residential construction, such as bathroom equipment, such products in 2000 amounted to 75 thousand tons, the amount of motor vehicles and other fields is only about 24 thousand tons. But from a global perspective, the automotive industry is the largest user of composite materials, the future development potential is still very large, there are many new technologies are being developed. For example, in order to reduce the noise of the engine, increase the comfort of the car, is focusing on the development of vibration damping steel plate two layer of cold rolled sheet of thermoplastic resin adhesion, in order to meet the development of the engine to high speed, high pressure, the direction of load, the engine piston, connecting rod, bearing has been used in metal matrix composites. In order to meet the requirements of lightweight, more and more new composite materials will be applied to the automobile manufacturing industry. At the same time, with the increasing attention to environmental problems in recent years, the application of polymer composites in the field of wood has been further promoted. For example, composite materials with plant fiber and waste plastic processing, in north America has been a lot of pallets and boxes are used, used to replace wood products; and biodegradable composites have become the focus of research and development at home and abroad. Thus it is predicted that twenty-first Century is the era of composite materials.

In recent years, the development of new material industry got strong support from government, initially formed a relatively complete new material industry system. Good momentum of China's new materials industry showed a rapid and healthy development, and achieved remarkable results in some key technology of the preparation of new materials, new technology, product development and energy saving, environmental protection and comprehensive utilization of resources, promote the formation and development of a number of new material industry. New material industry chain continues to expand, the breakdown of the field continues to emerge, further integration of upstream and downstream industries. At the same time, new materials and basic materials industry combined with increasingly close, its development trend is the structure of complex functions, functional materials, intelligent materials and devices integration, preparation of green technology, and ultimately achieve multiple functions, with a new generation of materials of low pollution and low consumption, low cost and long service life requirements.

### **The importance of the mutual coordination of the factors affecting the industrialization of new materials**

The development of new material industry is more and more dependent on the intersection of many subjects, the breakthrough of the frontier technology, and the trend of the industry to be further integrated. Industry concentration is increasing rapidly, especially the influence of multinational corporations on the development of new material industry. Multinational companies have a significant role in promoting the development of new materials industry. In the new material industry development process, there are still some problems, such as duplication of strength in research investment, lack of integration ability; in the overall planning of the industry, the situation of industrial structure and product structure are not unreasonable; industry structural adjustment and

industry transition delay period is too long, such as textile enterprises got a large number of exports of apparel fabrics and down, 60% to be imported, chemical raw materials and the losses of the enterprise, the annual import volume of polymer materials more than 700 million; management system fragmentation, resulting in the advantage of integration of new materials enterprises is not enough, not up to the reasonable economic scale; application integration between basic research and development of new materials is not good enough, the lack of high level personnel, engineering and industrialization have not received sufficient attention; other applications of high-tech industry of new materials in a passive state; many large new materials enterprises rely mostly on local mining resources, technology and markets are heavily dependent on foreign countries, industrial development has a strong vulnerability, etc.. In macro management, how to establish and perfect the new materials industry investment policy system, how to increase the tax and government procurement support, how to further expand international cooperation, especially for cooperation, how to strengthen the macro guidance and other aspects of the further research in the international standard core technology cooperation and new materials special needs, from the construction of national strategic industries, to study from the national economy fast development perspective.

The new material industry can be regarded as a system, the main factors affecting the industrialization of the interaction, constitute the whole industry system of power, through a variety of factors to complete the process of industrialization. The factors that influence the development of the industry can be divided into external factors and internal factors. Based on the above analysis, it can be concluded that the exogenous dynamic factors include 5: legal system, government guidance, investment mechanism, public service platform and market environment. The internal dynamic factors include the leading role of large enterprises, industrial base, industrial scale, industrial concentration, the degree of cooperation between enterprises, the transformation of scientific research into 8 factors. Exogenous factors and endogenous dynamic factors are interrelated and interactive, and under certain conditions, exogenous forces can be transformed into endogenous power. Moreover, the interaction between the various factors. It is the dynamic factor of the system that provides the synergy driving force for the industrialization of the new material system.

Therefore, it is especially important to clarify the relationship among the factors affecting the industrialization of new materials. It is clear that the optimization measures of the rapid development of industrialization of the new material, it should be taken to make the factors coordinate with each other to produce the overall effect, which can not be produced by the individual sports.

### **The hierarchy of factors affecting the industrialization of new materials**

The direct impact of the industrialization of new materials is the R&D capability and R&D personnel. The factors of science and technology is the source for the development of new materials industry, the value of R&D capability influence the new technological achievements, influence the whole industry profits; sustainable development of R&D personnel and the level of science and technology is the core condition of industrial development of new materials, and the ability of R&D capability and R&D personnel, affect research and development ability. For example, in composite materials area, there is a lot of problems in their research and development capacity.

Public service platform and transformation of research results can affect the market environment. The development level of the public service platform is related to the efficiency of the industrialization of new materials, and relates to the integration of scientific research institutions and enterprises. A smooth and complete information system can provide a direction for the development of the new material industry and provide unlimited business opportunities. At the

same time, the market environment affects the R&D capability and R&D personnel, which affect the entire new material industry. Intermediary platform and a good market environment can promote the development level of the new materials. From the reality of the situation, the development platform and the conversion rate of composite materials have yet to be improved.

The legal system、the leading role of large enterprises、government guidance and investment mechanism affect the whole new material industry. The legal system and the investment mechanism set up the various policies and regulations, so that the new material industry in the operating mechanism, intellectual property rights, competition mechanism and other aspects of national policy support and protection. The new materials industry's requirement of large scale and large investment, high-tech, new materials in the industry generally requires relatively large investment and construction, government guidance, the leading role of large enterprises and cooperation between enterprises of new material industry has great influence on policy, legislation, resources, and funds.

### **Optimization of new material industrialization**

Strengthen the construction of the new material personnel. The new material industry belongs to the knowledge and technology intensive industries, the lack of talent is one of the important factors restricting the development of the material industry. Therefore, pay close attention to the development of composite material industry talent introduction plan. The government and enterprises should strengthen the training field and the introduction of new materials through a variety of professional and technical personnel, establish and improve the incentive system, so as to improve the working efficiency and the enthusiasm; support the organization and construction of cooperative R&D team, to provide hardware and software conditions necessary for specialized talents, develop to attract foreign talents outside the region, and the team preferential policies to provide long-term intellectual support for the development of the industry.

Establish an effective system of scientific and technological innovation, improve public service platform. Deepen cooperation in research and innovation, and composite materials industry research and industry resources, the formation of research and development platform, engineering technology research center, key laboratory of the research, applied research and development simultaneously, development and commercialization of parallel. Strengthen the construction of innovative service platform, to encourage the integration of public service resources of scientific research institutions of composite leading enterprises, the public service platform for the establishment of public experiments, testing and other industries.

Improve the investment mechanism, increase financial guidance funds to support, promote social capital investment. Around the country's strategic emerging industry policy, echoing the layout of the relevant national industrial development. Raise funds for new materials industry accounted for the proportion of fiscal expenditure, the integration of special funds for loans or equity investment projects, mainly provide support to potential, good prospects and the urgent need for investment project.

### **Conclusion**

Although composite material is the sunrise industry in twenty-first Century, there are still many difficulties in the development process. In order to realize the development of the composite industry, it is necessary for the joint efforts of the state, society and enterprise.

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