

# THE PROBLEMS AND INNOVATIVE DIRECTION OF CHINESE GLASS ART FROM THE STUDY OF TRADITIONAL GLASS ART IN ZIBO CITY, SHANDONG PROVINCE

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## ABSTRACT

China has a very long history of glass. In the Ming and Qing Dynasties, Zibo Mountain area in Shandong Province of China became an important producing area of Chinese glass art, and Chinese glass art also reached a certain peak in this period, and many glass products were exported overseas (Sun, 2013). Since the 20th century, with the development of modern industrial technology, China's glass art has been renewed.

Chinese contemporary glass art has gradually developed under the promotion of the international Glass Studio movement, and the contemporary glass art education centered on colleges and universities has maintained good contacts and exchanges with the mature international glass art ecology in its development process, and has drawn a lot of mature experience in international glass art creation, teaching, exhibition and other aspects. This development model is based on the academic strength of colleges and universities and the evaluation system of research institutions to guide and promote the construction of the entire glass culture circle. After years of accumulation, glass art has taken root and sprouted in the mass cultural life and nurtured the national characteristics of contemporary Chinese glass (Han, 2018). The creation of the academic school is more inclined to the innovation of concept and shape, while the traditional handicraft industry is more inclined to maintain the continuation of professional manual technology. Therefore, there is still a separation between technology and art, individual and the whole in China's glass industry.

Therefore, the main purpose of this study is to study the history and development of Chinese glass art. For the Chinese local characteristics of glass craft - China's Shandong Province Zibo on the traditional and complicated traditional hand-made glass craft in all aspects of research and investigation. Therefore, in addition to advocating a new movement similar to the glass studio, research on how to better develop Chinese local glass art.

**Keywords:** Zibo, Glass art, Glass lamp technology, Glass blowing technology, Liuli

## INTRODUCTION

The purpose of this paper is to study the history, types, cultural inheritance and problems of the traditional glass art industry in Zibo, Shandong Province, China; Research on the process innovation and model making of Zibo traditional glass art in Shandong Province, China. Combined with the traditional glass art of Zibo in Shandong Province, China, the glass

art works with traditional Chinese characteristics and contemporary design concepts are designed. Through the collection of Chinese contemporary glass art documents and the analysis of its development process, this paper studies the development of Chinese glass art in different periods, as well as the development process of Zibo glass art in Shandong Province and how it is passed on. The pattern elements, shape and craft skills and characteristics of Zibo traditional glass in Shandong Province are studied. I hope that the exchange and discussion of this international conference can provide you with new ideas and inspiration. And promote the dissemination and promotion of glass art, and promote the exchange of Chinese traditional glass culture on the international stage.

### **Research Objectives**

This paper studies the history, types, cultural inheritance and problems of traditional glass art industry in Zibo, Shandong Province, China. Research on the process innovation and model making of Zibo traditional glass art in Shandong Province, China.

## **LITERATURE REVIEW**

### **1. Glass art in Zibo, Shandong Province, China**

"The former name of Boshan District of Zibo City was Yanshen Town, and this place is rich in minerals. Yanshen Town has a long history of glass production, at least in the Yuan and Ming dynasties has been one of the important areas of glass production in China." (Zhao, 2008) The origin of glass art in Zibo can be traced back to the Yuan Dynasty, when there were already glassmaking workshops in Boshan area of Zibo City, producing all kinds of glassware and ornaments. In the Ming Dynasty, Zibo glass art reached its heyday, and precious varieties such as "chicken oil yellow bottle" and "chicken liver stone bottle" appeared, which were favored by the royal family and dignitaries. In the Qing Dynasty, Zibo glass art continued to develop, and new craft forms such as inner painting snuff bottles and lamp Liuli appeared, which important gifts for Chinese became and foreign exchanges. During the Republic of China period, Zibo Liuli was affected by war and market competition and gradually declined. After the founding of New China, the art of this ancient craft was restored and developed. Zibo glass art is characterized by its materials, techniques and colors. The materials of Zibo Liuli are mainly kaolin, glass, metal oxides, etc., which are made through multiple processes such as careful matching, fine processing, high temperature melting and low temperature annealing. The craft of Zibo Liuli includes "blowing, drawing, pressing, cutting, carving, internal painting" and other ways, showing the ingenuity and skills of the craftsmen. Zibo glass technology mainly includes large furnace technology, round furnace technology and lamp blasting gun technology. There are many kinds of glass art and craft products in Zibo city, mainly beads, hairpins, cigarette holders, animals, flower balls, stationery, vases, painted snuff bottles, glass wire, glass tubes and so on. The color of Zibo Liuli art is represented by chicken oil yellow, chicken liver stone, blue and white, etc. The color is bright, the luster is soft and varied, giving people the enjoyment of beauty. Zibo glass art industry has been continuous since ancient times, but with the change of environmental protection transformation and export situation, Zibo glass art began to transform and upgrade, to do cultural and creative products, continuing the simple glass burning skills of the old generation. As exports increased and skills improved, industries began to transform. Folk artists and craftsmen also began to cooperate with some professional colleges and universities to design and produce some artistic and cultural works.

While glassmaking in China has traditionally been associated with functional objects such as vases and utensils, modern Chinese glass artists have embraced contemporary

techniques and styles to create innovative and artistic glass artworks. The following are several aspects of Chinese modern traditional glass art:

**Techniques:** Modern Chinese glass artists employ a variety of traditional glassmaking techniques, such as blowing, casting, kiln molding, and cold working. These techniques have been passed down from generation to generation and are used to create complex patterns, textures and shapes in glass art.

**Motifs and motifs:** Traditional Chinese glass art often incorporates cultural symbols and motifs that are deeply rooted in Chinese history and mythology. Drawing inspiration from traditional Chinese painting, calligraphy, nature and folklore, the artists create glass art that reflects China's rich cultural heritage.

**Ming Dynasty replicas:** A unique aspect of modern Chinese glass art is the reproduction of ancient Ming Dynasty (1368-1644) glass artifacts. Skilled glass artists recreate the exquisite beauty and craftsmanship of Ming Dynasty glassware, including vases, bowls and ornaments. These reproductions often demonstrate the virtuosity of traditional Chinese glassmaking techniques.

**Fusion of traditional and modern styles:** Many modern Chinese glass artists blend traditional Chinese aesthetics with contemporary styles and influences. They experiment with different forms, colours and textures to create unique and innovative glass artworks that bridge the gap between tradition and modernity.

**Cultural innovation:** Some Chinese glass artists use glass as a medium to explore and challenge cultural norms and traditions. They create thought-provoking installations and sculptures that explore social issues, cultural identity and the rapid changes taking place in Chinese society.

**Liuli art:** Liuli is a type of colored crystal glass that is popular in modern traditional Chinese glass art. Liuli art is characterized by its vibrant colors, translucency, and the use of casting techniques to create intricate sculptures and ornaments.

Modern Chinese traditional glass art is a dynamic fusion of ancient techniques, cultural symbols and contemporary creativity. It evolves as artists continue to push the boundaries of the medium, infusing their unique perspectives and exploring new possibilities.

## **2. Innovation in glass art**

Even the most traditional materials can have modernity and artistry through different process technologies, so the manufacturing of these arts and crafts is derived from the innovation of ideas, so that the original process technology can glow with a new life form (Tan, 2018).

Traditional materials are often formed and developed together with traditional techniques, shapes and cultural connotations. Functionally, its formation is specific, and at the same time it forms a relatively stable artistic language, which is a very important part of its tradition. Materials that are not culturally loaded often do not elicit cultural identification with a stable artistic language.

Generally speaking, the innovation of a certain traditional art can be functionally the innovation of the way of use, the intervention of the contemporary aesthetic way of modeling, the innovation of the theme, the addition of new materials and so on. As a typical representative of China's intangible cultural heritage, the sustainable development and innovation of Chinese traditional ceramic skills in the new era not only introduces new concepts, develops new directions of techniques and materials, but also extends the new artistic expression of traditional materials and skills by combining with other materials. When one medium and another form a sense of conflict, but finally ushered in some kind of balance intervention, to some extent means the birth of a new medium, between controllable and uncontrollable, tear, impact, condensation is not only a visual feeling, but make art a verb with infinite semantic extension. The combination of some forms and processes between materials is a feasible and

important direction for glass materials to support a variety of materials to achieve special effects that are difficult to show when presented separately, so as to expand traditional glass materials and techniques. For example, the combination of glass and ceramics, wood, metal, cement and other materials can present the possibility of linear form, the physical performance of the two materials at high temperature has inevitability, and the effect on the other kind of materials also has a certain regularity.

Another possible innovation direction in glass art is the combination of different glass firing processes. The principle of the lighting process is more similar to that of the blowing process, which is to soften the glass material by heating, and make the work through various actions with various tools. The lighting process also needs annealing. And the composition of the glass raw materials used in the lighting process is similar to that used in the blowing process. However, from the point of view of equipment, the equipment of the lighting process is much smaller than the blowing process equipment, the lighting process only requires an annealing furnace and a musket, the required space is small, and the use is more flexible. The lighting process is easier to control than the blowing process, making many details more convenient to make, and the control of the heating range is also the key to its process characteristics. Although the monomer made by the lighting process is small and exquisite, the process has a strong ability to combine, so that the creator can skillfully combine a single monomer to form a greater overall effect.

## **RESEARCH METHODOLOGY**

1. Qualitative research can be used to provide detailed explanations or examples. In-depth research on the status quo and existing problems of Liuli art in Zibo, Shandong Province, and then create related art products. Specific research methods include literature research, in-depth interview, field observation, design practice and other methods. Step 2: Data collection in the data collection stage, in-depth interview, through the in-depth interview with glass professional university professors and glass artists and other experts, collect their ideas and suggestions on the development of traditional Chinese glass art. Questionnaire survey, in-depth interview and observation method were used. A questionnaire survey was conducted in Shandong Zibo Ceramic Liuliguo Art Museum. At the same time, the researchers also collected historical documents, artworks and other materials related to Shandong glass art to add resources for research. Field investigation of the important glass art production area of Zibo city museums and concentrated exhibition sites. Step 3: Data analysis In the data analysis stage, we use content analysis, topic analysis and other methods to interpret and analyze the collected data in depth, focusing on the basic characteristics, inheritance issues and development direction of traditional glass art reflected in the glass art and culture data, and try to draw conclusions to provide reference for the development of traditional glass art in Shandong, China. Step 4: Summarize the results, analyze the results with the collected data, summarize the research results and compile a detailed report. This report includes an in-depth analysis of the development of traditional Chinese glass art, the presentation of data results, as well as recommendations for innovative new glass art works incorporating traditional Chinese glass art, and feedback of these results to the glass art creation team and related practitioners. To provide useful reference and inspiration for their creative design work.

2. In order to comprehensively and deeply analyze the collected data, researchers have used a variety of methods such as content analysis and correlation analysis. Through literary research and in-depth interviews, researchers have discovered the inheritance and practice of glass art in Zibo, Shandong Province. As an important producing area of Chinese glass art and glass culture, Shandong Zibo glass culture emphasizes the handwork and the inheritance of traditional images. These characteristics have been continued and inherited to some extent in

contemporary times. These traditional images and crafts occupy an important position in Shandong glass art culture. In the design of innovative glass art works, these traditional artistic elements can be integrated into the image characteristics of innovative works to carry out the analysis of inheritance and innovation. Through in-depth interviews, questionnaires and field visits, we learned that the glass art in Zibo, Shandong, China has strong cultural characteristics. They pay attention to the integration of traditional Chinese cultural legends. These Chinese cultural attributes are an important source of inspiration for the development of glass art. In the process of data collection, it is also found that many people are also very concerned about how to innovate traditional Chinese glass art, and look forward to more and more innovative works. Artists and glass professionals are constantly looking for the innovation and development direction of traditional Chinese glass art, and they advocate the combination of different techniques to create more glass art works that meet the contemporary social significance.

Through the analysis of these data, we have a deep understanding of people's awareness and preference for glass art. And the ideas and suggestions of the public and professionals for innovative Chinese glass art. When designing future glass art works, the characteristics of Shandong traditional glass art should be fully considered, and contemporary design concepts and innovative forms should be skillfully combined. To create innovative glass art works that not only have the significance of traditional Chinese glass culture, but also meet the contemporary social concepts and public aesthetics.

## **RESEARCH RESULTS**

Through the in-depth study of Zibo traditional glass art industry, we find that Zibo glass art has a long history and rich cultural connotation. Glass craft in Zibo can be traced back to the Ming and Qing Dynasties, mainly including glass blowing, carving, painting and other types. These skills have been passed down from generation to generation, forming a unique artistic style and regional characteristics. However, with the acceleration of modern industrialization, traditional glass art is facing severe challenges. First of all, the population of inheritors has gradually decreased, and the younger generation has little interest in traditional crafts, resulting in a fault in the inheritance of skills. Secondly, changes in market demand and the impact of modern industrial products have made the market share of traditional glass art gradually shrink. In addition, traditional glass art has shortcomings in innovation and adaptation to modern aesthetic needs, and it is difficult to attract the attention of young consumers.

In order to deal with the above problems, we explored the process innovation and model making of traditional glass art in Zibo. The research shows that the introduction of modern technology and design concepts can effectively promote the innovation and development of traditional glass art. For example, artist Qin Ling proposed: "The use of 3D printing technology and digital design tools can improve the accuracy and complexity of the glass process, creating a more diversified and modern glass art." In addition, through collaboration with local artist Ren Bo and designers, we have developed a series of innovative works that combine traditional craftsmanship and modern design. These works not only retain the unique charm of traditional glass art in Zibo, but also integrate modern aesthetic elements to enhance its market competitiveness and attractiveness.

In general, the historical and cultural value of traditional glass art in Zibo is its important asset, and through the process innovation and the application of modern technology, it can inject new vitality and development momentum. This research provides new ideas for the protection and innovation of traditional technology, and also provides strong support for the sustainable development of related industries.

## CONCLUSIONS AND DISCUSSION

Through the study of the traditional glass art industry in Zibo, Shandong Province, we draw the following conclusions:

First of all, Zibo glass art has a high historical and cultural value. The traditional glass art of Zibo has a deep historical foundation and rich cultural connotation, and its craft skills have been passed down from generation to generation, forming a unique artistic style and regional characteristics. Secondly, Zibo glass art is also challenging in contemporary times. Despite its valuable cultural heritage, traditional glass art in Zibo faces multiple challenges such as the fault of skill inheritance, the change of market demand, and the impact of modern industrial products. Through the introduction of modern technology and design concepts, Zibo traditional glass art can achieve technological innovation, improve the accuracy and complexity of products, and then meet the modern aesthetic needs. Finally, Zibo glass art also needs to enhance the market competitiveness. Combining traditional skills with modern design, the development of innovative works not only retains the unique charm of traditional art, but also enhances its market competitiveness and attracts more young consumers.

For these conclusions, the researchers present the following discussion. In the process of research, we found that in the process of protection and development of Zibo traditional glass art, we need to balance the relationship between inheritance and innovation. The historical and cultural value of traditional glass art determines that it must be effectively protected and inherited. The government and relevant institutions should increase support for inheritors of traditional skills, provide more opportunities for learning and teaching, and ensure the continuity of skills. In the context of globalization and modernization, innovation is the key to the sustainable development of traditional art. Through the combination of technology and design, it can not only expand the expression of traditional glass art, but also open up new market space. For example, the use of 3D printing technology can make complex glass structures, and digital design tools can quickly realize the prototype of ideas, which provide strong technical support for the innovation of traditional processes. It is also vital to raise public awareness and interest in traditional glass art. Through holding exhibitions, workshops and experience activities, more people can understand and experience the charm of traditional glass craft, so as to stimulate the interest and love of the young generation. Market demand is an important force driving innovation. Through market research and consumer feedback, the innovation direction of traditional glass art can be guided to make it more in line with the needs of modern consumers. For example, combining modern home design elements, the development of glass art suitable for modern life not only retains the essence of traditional craftsmanship, but also has practicality and aesthetics. The cooperation and exchange with domestic and foreign artists and designers can bring new creativity and inspiration to the traditional glass art of Zibo. Cross-field cooperation can not only broaden the horizon, but also bring technological and conceptual breakthroughs, helping to improve the overall level of glass art in Zibo.

Through the above measures, we believe that Zibo traditional glass art can not only radiate new vitality in the protection and inheritance, but also find new opportunities for development in the tide of modernization, and realize the double improvement of cultural value and economic benefits. Future research can further explore specific innovation cases and marketing strategies, in order to provide more detailed guidance for the sustainable development of Zibo traditional glass art industry.



Figure 1 The work "Think" combines glass sculpture with holographic imaging, Li Mingyu  
Source: Hanlin Shi (November 21, 2020)



Figure 2 The work "Rong" combining glass and ceramics, Tu Juan  
Source: <https://baijiahao.baidu.com/s?id=1759527967024650542&wfr=spider&for=pc>  
(March 3, 2023)






Figure 3 The work "Joinery" combining glass and wood, Scott Slagerman & Jim Fishman  
Source: <https://baijiahao.baidu.com/s?id=1675286757661306593&wfr=spider&for=pc>  
(August, 2020)



Figure 4 A work that combines glass blowing technology with glass lighting technology,  
Peng Yi  
Source: Zhang Miao, [https://www.sohu.com/a/352512121\\_394924](https://www.sohu.com/a/352512121_394924) (November, 2019)

Table 1 Firing tools for traditional Chinese glass making techniques

Order	Glass firing tools	Name and Interpretation
1.		<p>Large furnace: mainly used for producing vessels, bottles and bowls, glass strips, etc. After the raw materials are added to the crucible according to the formula, they are heated and blown until completely melted. The blowing craftsman takes out the melted glass material and blows it into shape with a blowing rod. The large furnace melts a large amount of glass material, making the work tedious and tiring, which is the basic work in the Liuli industry.</p>
2.		<p>Round furnace: mainly used for producing small handicrafts such as cigarette butts, flower balls, beads, miscellaneous items, etc. The stove is slightly smaller than the large stove, slightly higher than the ground by 60 to 70 centimeters. After the glass material is melted, the person working in the furnace can take out the glass material as needed for production. Usually, the glass material can be taken out twice a day and night, and the work time is 10 to 12 hours.</p>
3.		<p>Lamp worker flamethrower: The production method of "lamp worker" products mainly uses colorful glass rods as the main material, and uses oxygen and liquefied gas to heat the glass rods (the flame nozzle temperature is about 400 °C ~ 800 °C) to quickly melt the heated rods. Then, the operator uses pliers, knives and other small tools to carry out the entire process of shaping each product.</p>

Source: Hanlin Shi








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Table 2 Types of Traditional Glass Forms in Zibo, Shandong, China

Order	Types of Traditional Chinese Glass Artworks	Name and Interpretation
1.		<p><b>Beads:</b> Beads come in different sizes. Their production methods are also different. Beads are generally called "rice grain beads" and can be divided into five categories: round beads, lotus seed beads, necklace beads, Yao beads, Buddha beads, etc. Each category is divided into three levels: extra fine, medium fine, and fine.</p>
2.		<p><b>Liuli jewelry.</b> Refers to various Liuli material accessories used for women's headwear and children's headwear, with the largest category being combs and hairpins for women's hair combing. In addition, there are jade bracelets, earrings, rings, hair clips, etc.</p>
3.		<p><b>Animals:</b> Most of them are portrayed as traditional Chinese mythical beasts and animals with auspicious meanings, such as the traditional Chinese zodiac, lion, camel, etc., which are the specialties of folk artists.</p>
4.		<p><b>Flower Ball:</b> The shape of the flower ball is said to have originated from foreign countries. At the end of the Qing Dynasty's Guangxu reign, a Beijing based merchant brought a Swiss flower ball to Boshan to request a replica and named it "Wanhuaqiu". The product sold well and was subsequently promoted.</p>
5.		<p><b>Internally painted snuff bottle:</b> Internally painted snuff bottle is a famous handicraft in Boshan. The earliest inspiration came from Wang Fenghao, a businessman from Boshan in the late Qing Dynasty, when he saw Zhou using a hook shaped small pen to paint a crystal pot at the home of Beijing painter Zhou Leyuan.</p>
6.		<p><b>Glass fiber:</b> Glass fiber is a fine thread drawn from various colored glass materials, used to weave screens, colored lights, and other objects, known as the "technique of laying silk threads."</p>
7.		<p><b>Material Jade Bonsai:</b> Material Jade Bonsai is made of glass material to imitate jade patterns, with petals, leaves, and branches with small holes at the bottom, strung together with fine metal wires to form whole branches of flowers and trees, and placed in flower pots. Like precious jade carved flowers resembling agate, coral, tea crystal, amethyst, hibiscus stone, etc., and leaves resembling ink jade, Xiu jade, Venus stone, etc., it is an ornamental decorative handicraft.</p>

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## REFERENCES

- Boshan Stories (2021). "Royal Imperial Furnace in Boshan: Glass, Gateway to Luxurious Artifacts (Part Four)." In Boshan Cultural Research Institute.
- Liu, F. (2022). "Current Development and Heritage Protection Research on Lu Style Inside-Painted Snuff Bottles." Published in the journal *Art Market, China Academic Journal Electronic Publishing House*, 2022, 86-87.
- Wen, P. (2023). "COLORED GLAZE FAMILY CONTINUES A LEGEND." Published in the journal *INTANGIBLE CULTURAL HERITAGE, China Academic Journal Electronic Publishing House*, 2023, pp. 84-85.
- Cheese Supplement. (August, 2020). "Perfect Fusion of Glass and Wood: These Vases Have Wooden Shells and Glass Hearts." Retrieved from: <https://baijiahao.baidu.com/s?id=1675286757661306593&wfr=spider&for=pc>.
- Sun, Y. (September, 2013). "A Study on Early Boshan Glass." *Literature and Art Life*, p. 79.

- Han, X. (2018). "Research on the Development of Modern Glass Art and Glass Cultural Industry." *Journal of China Academy of Art*, 2018, Issue 1, China Academic Journal Electronic Publishing House, p. 128.
- Zhao, H. (2008). Study on the historical development of ancient glass in Zibo area. 2
- Tan, T. (2018). "THE USE OF A VARIETY OF MATERIALS IN GLASS." *Shanghai Arts and Crafts*, China Academic Journal Electronic Publishing House, p. 24.
- Zhang, M. (November, 2019). "Shaped and Presented: When Glass Grows into Trees." Retrieved from: [https://www.sohu.com/a/352512121\\_394924](https://www.sohu.com/a/352512121_394924).