Application of Computer Virtual Technology in Ceramic Packaging Design

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Abstract. At present, with the continuous development of science and technology, computer virtual technology has become one of the indispensable components in ceramic packaging design. These computer virtual technologies play an important role in the process of ceramic packaging design, effectively improving the efficiency and quality of ceramic packaging design, and the significance of its in-depth research is self-evident. Based on this, this paper discusses the application of computer virtual technology in ceramic packaging design. Firstly, it briefly discusses the related contents of ceramic packaging design and its basic design principles. Then, taking the actual product design as an example, it discusses in detail how the commonly used Rhinoceros and V-rayforrhinoceros can be effectively applied in ceramic packaging design, can be effectively applied in ceramic packaging design and their final results, with a view to providing reference for similar work in the future.

1. Introduction
In recent years, in the field of ceramic art design, computer virtual technology has been applied more and more. Besides the common virtual reality technology (VR), various softwares such as Rhinoceros and V-rayforrhinoceros have also been widely used. Therefore, in the ceramic packaging design, the traditional manual and mechanized methods have been transformed into high-tech auxiliary methods, which has contributed more to the improvement of ceramic packaging design level. Of course, for the need of rapid development of new products, it is still necessary to do further research on the application of computer virtual technology in ceramic packaging design.

2. Overview of Ceramic Packaging Design

2.1. Overview of Ceramic Packaging
Ceramic packaging is an important form of packaging materials, which is mainly designed and manufactured from ceramics. At present, it is widely used in domestic liquor products. In order to improve the design effect of ceramic packaging, grouting molding technology and color printing technology are usually adopted. As far as grouting molding technology is concerned, this technology has developed towards a more personalized and more design-oriented direction; As far as the new ceramic color printing technology is concerned, it has realized more vivid printed pictures and texts. Moreover, these printed pictures and texts do not affect the existing ceramic luster, and the outline of the high and low undulations on the surface of the ceramic package can still be clearly seen, giving people a three-dimensional sense, which makes the appearance effect of the ceramic package more prominent.
2.2. Computer Virtual Technology Software Commonly Used in Ceramic Packaging Design

In order to ensure that the computer virtual technology can be effectively applied to the design of ceramic packaging, it is a necessary way to choose the appropriate software [1-3]. In traditional ceramic packaging design, basic design software such as Photoshop and coreldraw are mostly used, which pay more attention to the surface design of ceramic packaging, but have certain limitations in the structural modeling of ceramic packaging [4-6]. Therefore, in the current design of new ceramic packaging, Rhinoceros modeling method is often used for design (Figure 1). There are many types of plug-ins in Rhinoceros software, among which V-rayforrhinoceros is the most commonly used one. This plug-in mainly plays the role of rendering, and its material setting is quite flexible. Besides the conventional diffusion, reflection and refraction, it also has lighting material, which can simulate the effect of self-body illumination. Not only that, the plug-in can also realize transparent mapping, displacement mapping, bump mapping, texture mapping and other mapping forms, as well as double-sided or double-color lamps, so that Rhinoceros software can simulate more realistic effects [7-8].

![Rhinoceros Software interface](image)

2.3. Significance of Ceramic Packaging Design Using Computer Virtual Technology

By using computer virtual technology to research and design ceramic packaging products, we can better display the expected effect of ceramic packaging products, provide theoretical basis and reference for the display of ceramic packaging, and contribute to better display of ceramic packaging products by using VR technology in subsequent links, so that there is better interaction between ceramic packaging products and consumers. Through this interaction, consumers can know the detailed information of ceramic packaging products in detail, evaluate the products, and make purchase choices, so that ceramic packaging products can better meet consumers' living needs. For merchants, by applying computer virtual technology in ceramic packaging design, they can realize more efficient product development and design, and further improve the accuracy of ceramic packaging design. This is not only beneficial to design more new ceramic packaging products, but also can break through the limitation of time and space through virtual display, promote and communicate products better, and effectively save the resources consumed in the design process [9].

3. Basic Design Characteristics and Principles of Ceramic Packaging Design

At present, there are many kinds of ceramic packaging products, and each product has its own unique characteristics. Therefore, different technical schemes are usually adopted in the design process. But on the whole, they have basically the same design characteristics and principles in packaging design, which are mainly manifested in the following aspects.

First of all, in the process of ceramic packaging design, we should pay attention to the use function and aesthetic function at the same time. Taking the cup design as an example, it must have the characteristics of individuality and different use on the basis of container function. It can be seen that in the process of designing ceramic packaging products, we should not only consider its own functions, but also consider its modeling design, material selection and decoration design comprehensively, so as
to ensure that it can present unique aesthetic characteristics and style, and make its practicality and aesthetic function unified [10-11]. Secondly, the design of ceramic packaging products is comprehensive to a certain extent. Under the computer virtual technology environment, it covers many aspects such as art design, visual communication design and computer technology. In order to ensure that it meets the actual needs of product display, it is necessary to choose appropriate morphological characteristics and space environment construction methods. Because the elements to be displayed must be expressed in a limited space area, it is necessary to shape the space and plane through computer virtual technology, and create a better interactive environment, so that ceramic packaging can achieve its due purpose in this environment. Therefore, in the design of ceramic packaging products, we should pay attention to the following points: First, from the attribute, the design process should be based on the actual function of ceramic packaging products, so that the design effect is subordinate to the actual function of ceramic packaging products, which needs to be carried out simultaneously from the aspects of space environment, props, audio-visual media, color, lighting and other decorative displays. Second, participation. For the design of ceramic packaging, it should be ensured that users can fully experience the quality and charm of ceramic packaging during the exhibition process, and attract and stimulate various users to actively participate in the interactive process, thus creating a good atmosphere of communication space. The third is the organic combination of scientific factors and artistic factors, which not only embodies the design concept of aesthetic elements, but also needs scientific and reasonable design. Fourth, the combination of economic factors and cultural factors. In the current ceramic packaging design, its ultimate design goal is to pursue economic benefits. In order to achieve this ultimate goal, it is necessary to rely on cultural factors to develop and design. By exploring the cultural connotation in the process of ceramic packaging design, it can give higher added value to ceramic packaging products, thus improving the quality of ceramic packaging.

Thirdly, we should pay attention to the visual communication design of ceramic packaging, which can be said to be the essential content of ceramic packaging design. On the one hand, it is necessary to deal with the design of spatial form, such as dividing the design picture with straight lines, so that the straight lines can guide the line of sight, or enriching the visual effect with curves, so that the ceramic packaging can reflect the characteristics of agility and elegance. Of course, design elements such as rectangle, triangle and circle can also be used, and these figures also reflect different characteristics. On the other hand, in space processing, the motion factor can also be used to make the final design result more attractive[12-13].

Finally, in the design process, we should pay attention to the use of colors, and choose different colors as the main colors according to the meaning of ceramic packaging. At the same time, we should also make full use of the lighting effect, further contrast the design texture and render a stronger atmosphere.

4. Application of Computer Virtual Technology in Ceramic Packaging Design —— Taking a Brand Winebottle Packaging as an Example

4.1. Modeling of Ceramic Packaging Products
Because winebottle modeling belongs to curved surface modeling, it is a difficult problem in 3D modeling for the design of wine bottle ceramic packaging, but it can be effectively solved by Rhinoceros software. The "curve" command in Rhinoceros software can be used to draw the outline of wine bottle. After the outline drawing is completed, select the "monorail scanning" command in Rhinoceros software, and the bottle body part will be divided into two sections, and then each section will be modeled by using the function of fading surface.

4.2. Performance on Material of Ceramic Packaging Containers
At present, ceramic materials are used as the main packaging container on the outer packaging of wine bottles in many manufacturers to achieve better appearance. In order to realize its performance on the
glaze material of ceramic packaging containers, it should be realized by using V-rayforrhino plug-in in Rhinoceros software. The specific operation is as follows:

1) Make the required "transparent glaze material" and "color printing ceramic material" in the material editor.

2) Use the "Add Vary Angle Mixed Material" command in Rhinoceros software to add the manufactured "Color Printing Ceramic Material" to the "Material1" option bar and the manufactured "Transparent Glaze Material" to the "Material2" option bar.

3) After all the materials are added, the expected effect can be obtained by executing the rendering instruction (Figure 2).

Figure 2. Rendering effect

4.3. Expression of Concave-Convex Graphic Effect in Ceramic Packaging Design

In the actual ceramic packaging design, stamping molding is usually used to create the convex and concave graphic effect in ceramic packaging containers. At the same time, the contour of bottle sample surface should have obvious fluctuation, and this fluctuation should be combined with the distribution of color printing patterns to create a three-dimensional effect. To achieve this effect, we must use the V-rayforrhino renderer in Rhinoceros software in the computer to design, so as to accurately show the three-dimensional effect.

After showing the three-dimensional effect, it is necessary to add graphic elements to the ceramic packaging according to the specific shape of the bottle. Therefore, in this stage, we should select "Color Printing Ceramic Material" separately and add a map file in the "Diffuse Radiation" layer under this option. It should be noted that the map axis in the added map file must be flexibly adjusted according to the shape of the bottle to ensure the correct position of the map file and prevent the design failure caused by the error in the position of the map file. After this link is set up, its rendering effect can be realized [8].

On this basis, the rendering effect settings in "Color Printing Ceramic Materials" can be modified again. The main methods are as follows:

1) Enter the "Map" layer in the "Color Printing Ceramic Material" option;

2) Select the "Replace Texture" function in the "Map" layer;

3) Use this function to add an outline picture with the same size as the bitmap in the "Diffuse Reflection" layer. (If it is impossible to ensure that the bitmap size is consistent, the aspect ratio can be consistent.)

Through the above three steps, the rendering effect of concave and convex in ceramic packaging will be realized. In the function of "displacement texture", the relief of ceramic packaging material is mainly calculated by renderer, which is based on the brightness of each pixel in the displacement map. Generally speaking, the greater the brightness comparative value of pixel, the greater the relief degree, and vice versa.

On the whole, in this design, by analyzing the characteristics of ceramic packaging container material and structure, using Rhinoceros software and its V-aryforrhinoceros plug-in function, the
computer virtual technology can be effectively applied in ceramic packaging design, and achieved good results. It is mainly manifested in the following three aspects: first, by applying these computer virtual technologies, it can accurately model the special shape ceramic packaging container which was difficult to model in the past; Secondly, through the application of these computer virtual technologies, the glaze effect of ceramic packaging surface can be displayed more intuitively, giving users a more real experience; Thirdly, through the application of computer virtual technology in every link, the color pattern in ceramic packaging has more concave-convex effect. Through the outstanding performance of these three aspects, the design of ceramic packaging has become more accurate and reliable, and the design efficiency and design quality have been significantly improved. Obviously, these computer virtual technologies can be used in similar ceramic packaging design in the future.

5. Conclusion
To sum up, in today's increasingly fierce market competition, in order to make ceramic packaging products have higher competitiveness in the market, it is necessary to apply appropriate computer virtual technology to fully participate in ceramic packaging design, so that ceramic packaging products can be better displayed in front of consumers. At the same time, it can also provide more technical support and theoretical support for the subsequent ceramic packaging design work. Therefore, in ceramic packaging design, computer virtual technology should be actively used to solve the shortcomings of traditional design methods, so as to continuously improve the ability level of ceramic packaging design. At the same time, in the future work, we should continue to optimize and innovate on the existing basis, and strive to apply more kinds and more novel computer virtual technology, so as to promote the rapid development of ceramic packaging design field.

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