On the Integration of Chemistry and Art

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\textbf{Abstract:} Chemistry and art are the fruits of labor created by humans. They always infiltrate and promote each other to realize the common development and prosperity in the establishment and development process. The combination of chemistry and art is inevitable trend of the discipline development and the construction of higher education model in the twenty-first century. The relationship between chemistry and art was expounded in this paper from the category of art. It indicated the function and importance of the combination of art and chemistry in the aspects of cultivating talents and changing the current situation. The combination has certain significance for reference in terms of promoting the coordinated development of chemistry and art, training diversified ways of thinking for students, mastering the comprehensive knowledge, enhancing the innovative spirit and practical ability as well as constructing talent training model and contents.

\textbf{Introduction}

Steinberg once said that art and science are different, but they are same. Whether they are different or not, it depends on what aspect you design (from “the truth of art science”). That is, science and art are different, but the art and science are interrelated and complementary to each other. They are the two main types of human creativity. It is the wisdom of human beings to make a living, work, summarize, inherit and improve the humans' material and spiritual needs in a long time. It is also the two kinds of special abilities of human beings and the product of the highest human soul. In the long-term development and creation process, they accompanied each other closely. [1] Chemistry is an important part of science and basic part, so it is closely related to the art. The organic integration of art and chemistry has become the mainstream and desired the ideological and cultural development in new century, which can compensate the science and technology artistic defects in order to better achieve mutual learning and promoting. The dependence and support of each other will eventually make the well-being of human life to promote the development and progress of mankind.

\textbf{Chemistry Meaning}

"Chemistry" is the science of change from literal interpretation. It is a natural science that studies the composition, structure, nature, and change law of matters at the atomic level. [2] Chemistry is one of the most important basic science. It is a discipline based on experiment, closely related to people, and one of the most ubiquitous subjects. Chemistry has an important role in our understanding and use of substances. Its development and progress has greatly promoted the progress of mankind and the development of society, and its achievement is an important symbol of social material civilization.

From the primitive society with the use of fire to the modern society with use of a variety of artificial substances, the role of chemistry always reflects and the results of chemical indicate everywhere. The life of mankind has been improved constantly, because chemistry has played an important and irreplaceable contribution. Chemistry also provides an important reference of material guarantee and logical thinking for the development of art.
Artistic Connotation

The original meaning of art is a kind of skills which are suitable for human being. It is a kind of means, methods and technology in the first time. With the development of human civilization, it is gradually given other functions and meanings.

Arnold Hauser said that the world only has society without art, but no art without society. Therefore, art is a social product of a certain period of time. Generally speaking, art refers to painting, sculpture, architecture, literature, music, drama, dance, film, etc. The knowledge of these eight kinds of art categories, are enough to set up the corresponding department. The emerging art of design, photography, video games and experimental art has been gradually accepted by academic and public, which have been classified as separated projects. Many art schools have established the relevant specialties.

The Integration of Chemistry and Art

Throughout human history, chemistry and art are human creative technology, embodying the two unique capabilities of human beings, divergent thinking and convergent thinking. In the long history of art development, countless examples confirmed the significant effect of chemistry. They mutually impact, absorb, promote and develop.

Due to the rapid development of society, the increasing of aesthetic sentiment will inevitably lead to the connection of art and chemistry more closely.

Chemistry and Painting

Painting, including multiple themes such as sketch, color painting, painting, printmaking, usually adopt exaggeration, abstraction, distortion, symbol and meaning to express subjective emotional experience and aesthetic needs, achieving the artistic image creation.

Chemistry is inseparable from painting in the composition, color and materials science. Color science is not only a science but also an art. John Naisbitt. Eaton professor said color is life, because a world without color looks like death in our opinion. Color just a science based on chemical paint, paper, canvas and other materials. And the characteristic of Chinese painting is the peculiarity of the brushes, Xuan paper, ink as well as other drawing tools and materials. Moreover, its color is conceived on the basis of base material and pigment. Without chemistry, it is difficult to achieve a variety of effects. The demand of color requires chemistry to research and design the organic pigment more colorful, strong and suitable for different places. [3]

Chemistry and Sculpture

Sculpture is mainly used in shape, color, quality and point, line, surface, body and other means to build a certain artistic image. The aesthetic characteristic is obtained via the statue in the space and the surrounding environment into one harmonious whole. However, the chemical factors are also essential. The different locations, different parts, different color collocation and how to choosing materials for different scenes are closely related to chemistry. And the demand of sculpture also promotes the development of chemical materials. [4]

Dunhuang Grottoes not only become world unique great treasure house due to the murals, statues, but also become a rich pigment specimen museum owing to the colorful pigments. A large number of painted mural are still dazzling and resplendent after more than 10 dynasties. In spite of the evolution of the natural conditions for thousands of years, the durability properties of the various pigments have been fully proved in the special natural laboratory. The use of a large number of bright colors reflects the excellence of the Chinese pigment chemical and smelting technology, playing a vital role on promoting the development, protection and promotion of arts.

Chemistry and Architecture

Architecture is a kind of symbolic visual art, which fully reflects the perfect combination of function and aesthetics as well as technology and art. [5] On the whole, it embodies the principle of "practical, strong and beautiful", which was emphasized by the ancient Rome architect Vitruvius,
trying to show the form of natural forces, human spirit and wisdom. The aesthetic association is inspired through the body structure, spatial combination, decoration methods etc. forming rhythmic beauty of abstract form, resulting in a variety of specific aesthetic experience.[6] However, material from sand and stone to concrete, the basic structure of the building materials, architectural decorative material inside and outside the house, colorful paint dye wallpaper and anti-corrosion protection of the buildings are chemical materials or naturally occurring chemicals. Moreover, its rigorous and clever conception is also a true portrayal of scientific thinking.

Chemistry and Calligraphy

Calligraphy is a corresponding isomorphic aesthetic structure established between the font style and emotion using brush, ink and Xuan paper, through the point and horizontal lines of Chinese character.

However, Chinese calligraphy with the changes of the carrier, from the age of Wang Xizhi calligraphy written on bamboo slips to modern calligraphy written on Xuan paper, the era of art calligraphy was created. Moreover, the types of ancient ink determine the effect of calligraphy and display techniques. The so-called true nature decides characteristics. Moreover, combined calligraphy and clothing materials together is not only the sublimation of calligraphy, but also the enhancement of art clothing.[7] And more calligraphers combined the chemical decompose and reaction with calligraphy as a whole.

Chemistry and Ceramics

Ceramics are works of art invented by the Chinese people having the value of aesthetic and appreciation value. The beauty of ceramic formation has a close relationship with chemical composition of raw material, glaze composition, temperature control and improvement of material technology. The chemical properties of these substances change as the temperature, causing a series of chemical changes in the material, and thus creating the beauty of ceramic in the aspect of form, quality and color. At the same time, with the passage of time and the deposition of history, the ceramic has been contained with a wealth of cultural beauty.

Chemistry and Bronze

Bronze refers to the alloy vessel casted by copper with tin, nickel, phosphorus, lead and other elements according to a certain proportion. Copper dominates and color is green, hence the name is bronze. Chinese ancient bronze culture was developed and famous in the world due to the production with sophisticated, majestic and superb technology.

The hardness of the bronze ware is directly related to the amount of tin. The ratio of raw materials, casting process, performance of the vessel and corrosion mechanisms are related to chemical. Because of the smelting and the ratio of copper, tin, lead and other elements, through the experimental casting, the excellent products are obtained with the formation of the best manufacturing process. Because of the development and progress of chemical metal smelting technology, the improvement of alloy technology and chemical principle is used in the bronze protection, making the bronze well-known in the world and popular with people.

The Urgency of the Integration of Art and Chemistry

In the real life, art activities are often integrated with the effect of chemistry everywhere. The fusion of art and chemistry has been carried out in silence. The fusion for the artist is beneficial to improving the creation level, enriching the creation content and enhancing the tight degree of logical thinking; for the chemist is good for improving artistic accomplishment and enhancing the cognitive rules and nature of art.

With the rapid development of modern social chemistry technology, the mutual influence, promotion and change of art and chemistry are inevitable. Therefore, the cross integration between disciplines is an inevitable trend in the modern times. Under this kind of situation, the traditional artistic form and status classification happened great changes, the combination of technology and
chemical is from the surface to the deep, such as the development of multimedia art and environmental design art which is the best example. At the same time, artistic research is facing the challenge of new material, new form, new problems and experiencing with the change of traditional method, angle of view, approach, or even aim, which require attention and need to construct the new methods and new perspectives to examine the emergence of new problems.

In addition, with the development of modern chemical technology, the public is increasingly unfamiliar to a number of cutting-edge science and technology, and providing the most basic cutting-edge technology education has become an important topic and task. And the art have been created by science and technology is not only the good carrier reflecting the charm of science and technology, but also one excellent knowledge dissemination way.

The Possibility of Integration

Chemistry and art are homology. [8] Chemistry and art are the wisdom crystallization from different sides to know the world and the pursuit of truth in the process of creating. The starting point, the birth process and role are same. Their contribution to the world is not only abstract, but also image, poetic, material and spiritual.

Chemistry has the same framework as beauty. The beauty, in the Webster dictionary, is the synthesis of a person or a thing with the quality or character, pleasing the senses or making the spirit happy and satisfied.

Most of the beauty of chemistry is reflected in the permutation and combination of crystal as well as atomic and molecular motion law in the microscopic world, while the beauty of art most performances as sensory pleasure in macroscopic appearance. The pursuit of them are beauty activities.[9] Chemical beauty referring to the precise science, is the pursuit of the beauty activities. The results are works of art with lure of beauty, embodying many harmonious beauty and vivid law. Mendeleev's periodic table is the order of the world's various elements as a model and a symbol of the beauty. Artistic beauty is the pursuit of local and whole coordinated creation, striving to achieve a lively, cheerful, poetic, and inspiring effect in the creative process. They are to express the unity, universality, abstraction, integrity, simplicity and novelty of knowledge.

Chemistry and art have same contribution. The truth of chemical exploration is consistent with the beauty of art. It is inseparable and complementary. Chemical truth is actually beautiful, is better understanding the physical world and accessing to material wealth and is of benefit to mankind; while the beauty of art is in pursuit of the harmony of the spirit and the environment, enabling people to enjoy the pleasure and goal. Truth is the highest state of beauty, and beauty is the recount of truth. Both of them with human understanding of the world and fruitful results of the transformation of the objective world are the contribution to the world to meet the needs of human material and spiritual needs.

Summary

In a word, chemistry and art are always accompanied and inseparable. The mix has not stopped. Combined examples can be found everywhere, while the separated time is still to be put to textual research. The combination of chemistry and art greatly shows the artistic expression and expands the space and time of artistic expression. Organic fusion of chemistry and art together will play a vital role on improving university talent training mode, extending talented person thinking way, improving their overall quality, expanding cultural quality and meeting the needs of society, which can yield twice the result with half the effort. The communication between art and chemistry is an inevitable trend and the hope of all the people. The combination and complement of art and chemistry will promote the world better and faster development and emit more brilliant scientific light.
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Reference


