Advantages and Disadvantages of Ceramic Materials in Environmental Art

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Abstract. It’s an inexorable outcome that modern ceramics is included in public environmental art, and this is also a new research direction which extends the expression scope of ceramic materials. The understanding of advantages and limitations existing in the involvement of modern ceramics into the realm of public art can give full play its advantages and mitigate its limitations in a scientific way.

1. Introduction
As people’s life demands tend to be diversified, they have more requirements for spatial form and environment and pursue diversification of environment-endowed spiritual realms. Involvement of ceramic materials into public environmental art is rightly a powerful supplementation for diversification of spiritual culture. Ceramic media derive from natural environment and return to public environment created by human beings in the form of environmental art, and this is recreation of environment with the value of expanding the realm of public art. In the meantime, involvement of ceramic materials is based on special ceramic crafts with certain limitations, so augmenting their advantages and reducing their disadvantages constitute a topic on which ceramists lay the emphasis.

2. Advantages of ceramic materials
With powerful expressive force in shaping the space of public environmental art and unique natural charm in spatial landscaping, ceramic materials can generate particular feelings and cultural exchange in coordinating the relationship between man and environment, and meanwhile, ceramic art can fuse with other arts, all of which are decided by the three following advantages: characteristic advantages, appearance advantages and humanity feature advantages of ceramic materials.

2.1. Characteristic advantages
Clay, aluminum oxide and kaolin are the main constituent parts of ceramic materials. Porcelain clay is turned into potter, which can contain water, when fired to 700°C. It is then porcelainized as the temperature rises to 1,230°C, and after firing, the property is stable and texture is hard. Ceramic materials are the most ancient, primitive and plainest art language and practical materials in public art, and their main characteristic advantages include antifouling property, waterproofness, plasticity, environmental protection & ecological character, and performance stability.

Antifouling property is an essential property for ceramic materials as environmental design materials. Comparable to glass texture, this antifouling property mainly relies on microporous protective layer
formed on surface firing, and these micropores guarantee antifouling property of ceramic materials; Waterproofness is one of basic properties of environmental ceramics. Ceramic materials have been applied to various products which contact water every day such as bathtubs, counter basins and toilets by virtue of their superior waterproofness, so the waterproofness is irreplaceable by other materials; High plasticity is a guarantee for abundancy of ceramic products, the creation foundation for ceramics is plasticity of ceramic materials, and raw ceramic materials can be continuously modified and created before drying and molding. In order to form unpredictable textural effect with rich layers, ceramic materials can be cut, kneaded, impressed, hollowed and portrayed before drying of the ceramic body; environmental protection & ecological character are the most essential characteristic of ceramic materials. The property of ceramic materials is between metal and nonmetal material, and most of them are compounds of C, O and N with clay, aluminum oxide and kaolin being the main constituent parts and characteristics of zero radioactivity, non-pollution and sustainable utilization. Industrial wastes like industrial pulverized fuel ash can be recycled together with ceramic materials. Environmental protection & ecological character of ceramic materials are superior to those of commonly used materials such as timber, metal and glass; Property stability is mainly embodied by sturdiness, durability and uneasy corrosion of ceramic materials. Fired under the temperature as high as a thousand degrees centigrade, ceramic materials have solid shape and inconstant colors, being able to keep their original appearance even as time fleets past and even they are exposed to wind and rain.

Besides the abovementioned basic properties, zero radioactivity, antibacterial property and noise immunity of ceramics also meet modern requirements for environmental protection and health. Ceramic materials in environmental art can satisfy the demand of the public and adapt to social development trend only when enjoying scientific and healthy development.

2.2. Appearance advantages

Appearance advantages of ceramic materials in environmental art originate from the application of ceramic texture, which is the most direct expression form of ceramic art and expresses creative concept and emotion of ceramists. Ceramic texture includes pug texture, glaze texture and fire texture.

Textural beauty of ceramic pug refers to sense of beauty generated due to abundant texture structures and changes on ceramic surface. Ceramists produce textural effects by impressing, etching and kneading the wet body before firing. The rhythm specific to the texture, sense of connected, overlapped, thin and thick, dense and sparse and staggered beauty and the textural imaginations with different degrees of roughness, urgency and hardness are textural languages and effects created by ceramists according to the coordination between the work and environment.

Textural beauty of ceramic glaze is the major advantage of ceramic materials relative to other decorative materials. Glaze takes minerals such as feldspar, kaolin, mica and quartz as basic materials, and then other minerals are added to generate different changes of glazing colors. Different firing modes and firing temperatures will generate different effects. Glaze richness is a specific property of environmental ceramics and sense of beauty of glaze property differs from colors and lusters of other materials.

Textural beauty of fire is also an advantage peculiar to ceramic materials. Fire use not only generates qualitative change of clay material but also endows different textural effects so that ceramic materials have artistic expressive force different from other environmental ceramic textures. When different firing methods are used, fire texture embodies a kind of natural and primitive breath in a specific environment. Unpredictability and contingency of fire and its natural and agamous textural effects make environmental ceramics full of unique and mysterious artistic appeal.

2.3. Unique humanistic flavor of ceramics

Humanistic concern is concern of human survival status and affirmation of human dignity and living conditions according with humanity. It is a sign of progress of social civilization and reflection of enhanced human self-awareness. With public and epochal characters, ceramics in environmental art represents aesthetic idea of the public and humanistic spirit of the era, and humanistic concern is an
essential embodiment of when the two are fused together. Modern ceramics is of thick cultural deposits and cultural characteristics of national spirit. When it is involved into the field of public environmental art, it shows up a kind of cultural inheritance which generates resonance among people. Ceramic materials, which have unique humanistic breath, can be employed to press closer to and attract more attention to human survival and development problems.

3. Disadvantages of ceramic materials
As modern ceramics is involved into the field of environmental art, artists perfect overall design and creation by virtue of advantages of ceramic materials, but relatively speaking, ceramic texture also has its obvious defects. Just as traditional ceramics, which is restricted by materials, craft, site and function, fragility, deformability, reliance on climate, difficult mastery of firing process and complexity have remarkably restricted the development of ceramic materials in environmental art.

Fragility is the major disadvantage of ceramic materials with very high requirements for transportation and installation. Ceramic works can be easily broken when being collided by hard objects. This fragility in public places becomes a potential safety hazard when ceramic materials are involved into the field of public environmental art; The fragility problem exists in the body drying and firing processes. If it is deformed after firing and molding, it will have a direct impact on later-phase installation of the work, and some modules even need to be scrapped and reproduced. This is a problem which will be encountered by all large-scale ceramic works, and to solve it needs very high operative skills and rich time experience; Processing and production of ceramic shaping have a high reliance on climate. Outdoor large-scale ceramic works usually have thick bodies which are not easy to dry, they can not be dried up at an accelerated speed under normal circumstances, so they should be naturally dried. There are many complicated production procedures of ceramic shaping. The neglect of any link will have a direct bearing on the last firing effect and installation; It’s difficult to master the final effect in the firing process of ceramic materials. As it is not easy to master temperature in the kiln, temperatures at different kiln locations are also different. Wonderful glazing color change makes it difficult for modern ceramics to involve into the field of environmental art. Too low or too high temperature will lead to problems like change of glazing color, color shift and even no color development, so the production of ceramic works in public environment spends a long time; Moreover, outdoor large-scale and complex ceramic shaping and firing are quite difficult. Ceramic materials can easily go through shrinkage strain due to hard fire, and as a result, the work surface becomes uneven or the performance of ridge and corner is not sufficient enough. For large-scale works formed through segmentation and splicing, plate gaps will be very conspicuous, which impacts the integrity of the shaped work. In addition, large-scale works are spliced on the construction site, so it’s difficult to transfer and move them.

4. Remedies
In the era when modern design concepts are continuously updated, the deficiencies of ceramic materials themselves are overcome by creating new materials, new crafts and new strategies. Fragility is an obstacle for ceramic materials to enter environmental art. To avoid this problem, ceramic landscape walls in environmental art are usually spliced using ceramic chips. Besides, exquisite crafts are used in modern ceramics with artificially synthesized inorganic compounds taken as raw materials. Relative to traditional ceramic materials, their stability is improved by a large margin. The superstrong high temperature resistance, corrosion resistance and wear resistance have laid a solid foundation for them to join in the design of landscape environment. For instance, the American artist Bruce Howdie invented Na pottery firing technology, blending Na into clay surface to preserve the material integrity and make it sturdy and durable. People have improved raw materials and crafts in Jingdezhen, China, so that pottery body becomes finer and smoother, glaze becomes more penetrating and clearer and craftsmanship becomes relatively simple and convenient. Artists can combine other comprehensive materials to compensate for texture limitations on the precondition that ceramic traits are highlighted, so as to fully express artistic view, outlook on life and emotion, etc. of creators.
Rich expressive force of ceramic materials in public environmental art not only expresses personal emotions of artists but also reproduces the traditional aesthetic concept in China, and not only retains the particularity of ceramic materials but also differs from modeling language and mode of expression of other arts. Meanwhile, for ceramic materials, it’s necessary to expand new fields, continuously seek for and create new materials and new crafts to avoid deficiencies of ceramic materials themselves so as to bring about a new look to ceramic expression.

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