

Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The “Beauty of Family Relationships” Series

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Abstract

The Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The "Beauty of Family Relationships" Series, has the following objectives: 1) to develop and test the physical properties of clay bodies and glazes incorporating volcanic stone powder from Buriram province to determine their suitability for artistic creation; 2) to create contemporary ceramic sculptures using volcanic stone powder from Buriram province as a raw material; 3) to disseminate the contemporary ceramic sculptures through exhibitions, publications, and other media to the public; and 4) to integrate research into teaching and academic services, promoting shared aesthetic experiences through knowledge sharing. In the study of clay bodies, the optimal mixture ratio was found to be 50% Ban Kruat clay and 50% ball clay, further enhanced by the addition of 15% basalt stone powder. This resulted in a unique color and texture, suitable for forming large-scale pieces. For the glaze, a composition of 60% basalt stone powder, 30% feldspar, and 10% ball clay was fired at 1230 degrees Celsius. The resulting glaze exhibited excellent properties, allowing for the layering of different glazes to achieve a diverse range of beautiful colors. In the creative process, the researchers designed the artworks by sketching 2D and 3D drawings. The designs were divided into five sets based on ceramic forming techniques: Set 1 utilized coil building; Set 2 employed pinching and coiling; Set 3 involved slab building; Set 4 used wheel throwing; and Set 5 focused on sculptural techniques. The creative process revealed unique and distinctive characteristics of the artistic creation. The artworks are not limited in terms of shape, form, or decorative techniques. The researchers were able to design and create a diverse range of works according to the intended objectives, while adhering to the design principles based on the concept and inspiration derived from the Beauty of Family Relationships. These contemporary ceramic sculptures consider both aesthetics and functionality, resulting in a new form of sculptural expression that is harmonious, aesthetically valuable, and fully functional in accordance with the purpose of each piece.

Keywords: Contemporary Ceramic Sculpture, Basalt Stone, Beauty of Family Relationships.

In the creation of ceramic art, the design stage is crucial and adds aesthetic value and artistic merit to the work. The designer must have a foundation in art, design principles, and design knowledge to create a piece of work effectively. They must consider the techniques and steps involved in ceramic production, ensuring they align with the type of work being created. In Thailand, the first National Ceramics Exhibition and Competition was held at the end of 1986. This event has continued to the present day, occurring every two years. The Cabinet resolution establishing this event aims to promote the production of various types of ceramics, benefiting creative works and enabling the preservation and development of forms, techniques, and production technologies. It also seeks to disseminate works that showcase the skills and wisdom of Thai designers and artists, while instilling values in students and the general public regarding the beauty and worth of ceramic works created by artists in diverse forms. Furthermore, it aims to provide Thai artists with opportunities to express their skills and individual talents, leading to the potential for developing creative works in ceramic art across artistic, craft, and industrial categories, gaining recognition both nationally and internationally (Vatchara Vachirapattarakul, 2006: 73).

Buriram province is home to the remnants of several volcanoes, including Khao Angkhan and Khao Kradong volcanoes. These volcanoes are extinct, with varying ages, the oldest dating back no more than 2 million years. The traces of lava flows have been largely eroded, and the weathered rock has decomposed into soil, leaving behind only the most durable stones. One notable rock is basalt stone, a crucial construction material in the lower northeastern region. Basalt quarries exist where the stone is blasted and crushed for road and railway construction, as well as for mixing into concrete used in various buildings, such as those at the Silachai, Silathong, and Silaphet quarries (Chumphon Wichiansiri, 1985). The crushing process produces stone dust or powder, which

has no commercial value and contributes to air pollution. Based on previous research, the researcher has investigated the use of volcanic stone powder as a raw material, which can significantly reduce production costs for both slip casting bodies and glazes. Following the recommendations of that research project, the researcher developed a new project focused on developing low-temperature clay bodies and glazes using basalt stone powder to further reduce production costs in the ceramics industry. This involves the design and creation of prototype industrial ceramic products utilizing materials derived from volcanic stone powder sourced in Buriram province.

In this study of concepts and symbols related to the beauty of family relationships, the researcher analyzed knowledge about family relationships through experiences, thought systems, and symbols that each family chooses to represent love, connection, warmth, and caring. This analysis was conducted by examining the framework of symbolism, which reflects the dimensions of human thought and belief through symbolic forms and the meanings of relationships in various dimensions. The results of this study led to the synthesis and design of forms suitable for representing these concepts in the creation of contemporary ceramic sculptures under the theme "The Beauty of Family Relationships".

Based on the aforementioned rationale, the concept emerged to further develop clay bodies and glazes using raw materials derived from volcanic stone powder found in Buriram Province. This development aims to create contemporary ceramic sculptures in the series "The Beauty of Family Relationships," utilizing the unique characteristics of Buriram's volcanic stone powder as the primary material. For the glazes, the research will build upon existing glaze formulations from prior studies to introduce new dimensions. Inspiration for these glazes is drawn from the beauty of family relationships. The ultimate goal is to advance the field of Thai ceramics to achieve international

recognition and standards, disseminating ceramic artworks through exhibitions and publications with a purpose of sharing knowledge and creative processes of ceramic artworks to both national and international audiences.

Objectives

1. To develop and test the physical properties of clay bodies and glazes incorporating volcanic stone powder from Buriram province, determining their suitability for creating contemporary ceramic sculptures in the "Beauty of Family Relationships" series

2. To create contemporary ceramic artworks and sculptures using raw materials derived from volcanic stone powder sourced in Buriram province, under the theme "The Beauty of Family Relationships"

3. To disseminate contemporary ceramic sculptures through public exhibitions and to produce video and print media for the dissemination of academic knowledge

4. To integrate research into teaching and academic services by fostering the knowledge sharing and the development of local materials for contemporary ceramic sculpture between researchers, the public, and students in the field of Ceramics Technology and Design

Conceptual Framework

The research project "the Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The 'Beauty of Family Relationships Series'" has the following research framework:

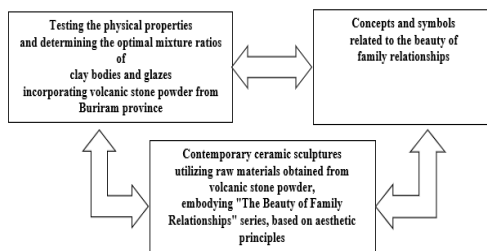


Figure 1. Conceptual Framework for the Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The "Beauty of Family Relationships" Series

Research Methodology and Procedures

This research study was conducted using the following methods:

1. Study theoretical knowledge, relevant research, and environmental data.

2. Establish a conceptual framework for developing contemporary ceramic sculptures, along with experimentation on raw materials

3. Develop creative inspiration by analyzing creative data in various dimensions, drafting designs, and analyzing sketches to determine the direction of the creative process.

4. Create contemporary ceramic sculptures based on concepts and inspiration, using media and materials resulting from experiments with clay bodies and glazes derived from volcanic stone powder from Buriram province

5. Analyze the created contemporary ceramic sculptures based on aesthetic principles

6. Exhibit the created contemporary ceramic sculptures

7. Summarize and report the research findings

Results

In this research, the research team followed the research procedures, analyzed the results, and summarized the research findings according to the research objectives as follows:

1. Summary of the development and testing of the physical properties of clay bodies and

glazes incorporating volcanic stone powder from Buriram province, determining their suitability for creative work.

1.1 Summary of the study on the mixture ratios and physical properties of Ban Kruat clay and ball clay.

The researchers chose to use the line blend method for mixing clay bodies, utilizing two types of raw materials: Ban Kruat clay and ball clay.

Table 1. Mixture Ratios of Two Raw Materials

Formula No.	1	2	3	4	5	6	7	8	9	10
Ban Kruat clay (%)	100	90	80	70	60	50	40	30	20	10
Ball clay (%)	0	10	20	30	40	50	60	70	80	90

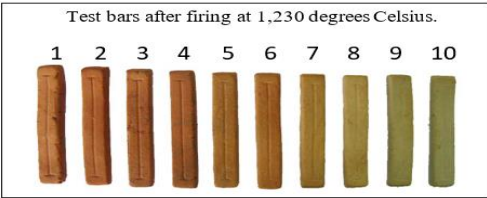


Figure 2: Test Tiles for Physical Properties of Clay Bodies

The results of the physical property tests of the clay bodies, following standard ceramic testing procedures, revealed that Formula 6, which contains a mixture ratio of 50% locally sourced Ban Kruat clay and 50% ball clay,

exhibited the following properties after bisque firing: a light brown/cream color, 9.8% shrinkage, 3.70% water absorption, and a strength of 461.23 kilograms per square centimeter. These values fall within the parameters of stoneware ceramics, which typically have shrinkage of no more than 15%, water absorption of no more than 5%, and high strength, producing a clear ringing sound when struck.

1.2 Summary of the study on mixture ratios and physical properties of Ban Kruat clay and ball clay (100 parts) with the addition of basalt stone powder at percentages ranging from 5% to 50%.

Table 2. Mixture Ratios of Raw Materials on a Table with Equal Incremental Increases, 10 Points Total

Point No.	1	2	3	4	5	6	7	8	9	10
Ban Kruat clay/Buriram	100	100	100	100	100	100	100	100	100	100
Basalt Stone Powder (%)	5	10	15	20	25	30	35	40	45	50



Figure 3: Test Tiles of Ban Kruat Clay and Ball Clay (100 parts) with 5-50% Basalt Stone Powder Addition

Test results indicate that clay body Formula 3, consisting of a 100-part mixture of Ban Kruat clay from Buriram province and ball clay, with the addition of 15% basalt stone powder, exhibited the following properties after bisque firing: a light brown/cream color, 13% shrinkage, 4% water absorption, and a strength of 172.23 kilograms per square centimeter. These values align with the characteristics of stoneware ceramics, which typically have shrinkage no more than 15%, water absorption no more than 5%, and high strength, producing a clear ringing sound when struck. This formula is

suitable for wheel throwing and does not exhibit slumping after firing, even when forming large pieces.

1.3 Summary of Glaze Mixture Ratio Testing

The determination of mixture ratios using the triaxial blend diagram involved three raw materials: basalt stone powder, feldspar, and ball clay. A total of 36 experimental points were designated, with glaze firing conducted at 1230 degrees Celsius. The research team selected point 6, weighing the ingredients according to the following proportions: 60% basalt stone powder, 30% feldspar, and 10% ball clay. These materials were then ground and mixed according to standard glaze preparation procedures. The glaze was applied to bisque-fired products and fired at 1230 degrees Celsius. The resulting glaze exhibited a complete, glossy, opaque appearance with a dark, shiny ball color and good uniformity.

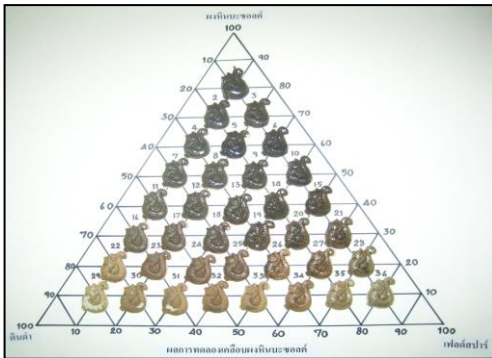


Figure 4. Test Tiles After Glaze Firing at 1230 Degrees Celsius

1.4 Layering Different Glazes over Basalt Stone Glaze at 1230 Degrees Celsius: It was found that the color of the glaze depends on the type of glaze used. The researchers can select formulas with desired colors and glossiness based on the melting characteristics of the glaze suitable for each design.

2. Summary of the Creation of Contemporary Ceramic Artworks and Sculptures Using Raw Materials from Volcanic Stone Powder in

Buriram Province: The "Beauty of Family Relationships" Series

The creation of ceramic sculptures in this series employed Formalism aesthetics in the style of Semiabstract art. The aim was to create works emphasizing design values on the surface, structural form design, and the coordination of artistic elements and design principles. This involved creating new forms, achieving beauty through visual elements (dots, lines, shapes, forms, colors, weights, textures, and negative space), and various techniques chosen by the creator as a medium to express ideas. The work process is as follows:

2.1 Analysis of the Concept "The Beauty of Family Relationships" and its Application to the Creative Process

The research team used the concept "The Beauty of Family Relationships" as inspiration to present various attitudes, forms, structures, appearances, and symbols derived from this concept. This was achieved by utilizing clay bodies and glazes made from volcanic stone powder, employing layering techniques to create unique colors and textures that reflect the evolving nature of family life in response to the environment. The sculptures express the social life, bonds, love, beauty, and impressions of individuals, arranged in aesthetically pleasing compositions that incorporate symbolic forms and patterns derived from human figures. These figures are simplified in detail to complement the decorative elements. The sculptures narrate the changing and dynamic relationships within families, emphasizing the need for flexibility to foster connections and ultimately achieve the Beauty of Family Relationships in their fullest form.

2.2 Design Sketches

The research team created design sketches, divided into five sets based on ceramic forming techniques. This process consisted of two steps:

2D Line Drawings: These drawings illustrate the main structure of the forms and some details, serving as a guide for creating the 3D forms. The sketches were divided into five

sets according to ceramic forming techniques, including:

1. 2D Line Drawings - Set 1: Sculptures formed using the coiling method

2. 2D Line Drawings - Set 2: Sculptures formed using the pinching method

3. 2D Line Drawings - Set 3: Sculptures formed using the slab building method

4. 2D Line Drawings - Set 4: Sculptures formed using the wheel throwing method

5. 2D Line Drawings - Set 5: Sculptures formed using sculptural techniques

3D sketches are scaled-down models that allow for visualization in three dimensions, including width, length, height, structure, and various perspectives. The research team selected compelling 2D sketches from all five sets and transformed them into 3D forms. These forms were then sculpted using clay bodies made from volcanic stone powder from Buriram province and glazed with glazes also derived from Buriram volcanic stone powder. This process enabled the analysis of various dimensions, including width, length, height, structure, perspective, and details of the decorative elements.

2.3 Creation of Contemporary Ceramic Sculptures: "The Beauty of Family Relationships" Series - Forming Techniques Based on Five Ceramic Processes

1. Set 1: Coiling Technique. The researcher captured the emotions and personalities of family members (father, mother, and child) and expressed them through a narrative representing the unity within a family. This unity is demonstrated by the interconnectedness of various forms. The sculptures were created with aesthetically pleasing new forms using visual elements, decorated with layered glazes made from volcanic stone powder, and partially wiped back to reveal traces of the forming process. This technique expresses warmth, steadfastness, love, and bonding, serving as a narrative to convey meaning. The symbolism of human bodily expressions is used to represent emotions in line with the theme of family relationships.

2. Set 2: Pinching Technique This ancient forming method, practiced for thousands of years, allows for the creation of diverse forms and is suitable for producing artistic crafts. The researcher incorporated the structure, stories, and traces of human figures within a family to create sculptures in a semi-abstract style. This was achieved by utilizing rhythmic or varying movements, both close and distant or continuous. The repetition of visual elements like weight, color, shape, and texture creates intervals or frequencies that are harmonious, blended, or even conflicting at times, resulting in a balanced composition. The arrangement of human figures involves overlapping or positioning them while considering the rhythm of lines, textures, and negative space. The content focuses on the changing and dynamic relationships within families, emphasizing the need for connection to foster positive relationships and ultimately achieve the Beauty of Family Relationships in their entirety.



Figure 5: Coiling and Pinching Techniques

Set 3: Slab Building Technique. This technique is suitable for creating works with rectangular or unusual shapes. After rolling the clay to the desired size, it should be allowed to reach a leather-hard state before being cut into the designed shapes. The pieces are then assembled using slip, firmly pressed together, and the seams are smoothed with small coils of soft clay for added strength. The researcher continued to incorporate the structure, narrative, and proportions of human figures to create sculptures with harmonious proportions. This refers to the relationship between the sizes of different units, both within a single form and between forms, as well as the harmonious

relationship of visual elements. Proper proportions contribute to the beauty of art and facilitate the expression of emotions and feelings according to the artist's intentions.

Set 4: Wheel Throwing Technique. In this research, the researcher used wheel throwing as the primary forming technique, while still adhering to the narrative and traces of human figures as symbolic media. The researcher expressed the social life of individuals through distorted facial features, depicting their struggles for survival. Visual elements were arranged to create compelling artistic compositions, using layered glazes to represent the concealment of true emotions in a competitive society. On the other hand, the sculptures also depict the stories and traces of faces within families amidst change and movement. Dark glazes are applied and then wiped away to reveal the clay body and visual elements that signify unity and the need for connection within families to foster positive relationships. This expression of beauty and impressions is achieved through the artistic composition of interrelated forms and patterns derived from "people," creating a harmonious unity without conflict. This harmonious relationship of dots, lines, shapes, forms, colors, and textures serves as a symbol of the Beauty of Family Relationships.

Set 5: Sculptural Forming Technique.

This technique involves forming sculptures using traditional sculptural methods, including bas-relief, high-relief, and free-standing forms. The works in this set emphasize the unique characteristics of the clay body made from Buriram volcanic stone powder. They express the way of life within families, showcasing love, connection, beauty, and cherished moments. The sculptures depict communication and conversations on various topics, highlighting both the similarities and differences among family members across different age groups. The forms and details are created using visual elements, conveying emotions and feelings through facial expressions in a semi-abstract style. These sculptures are arranged in artistic

compositions, incorporating diverse decorative elements. Scratching and marking techniques are used to create textures that tell a unified story, harmonizing and connecting the various components. This serves as a medium for conveying thoughts and content, resulting in both sculptures that showcase the raw clay body and those with layered glazes.



Figure 6: Slab Building, Wheel Throwing, and Sculptural Creation Techniques

3. Dissemination of contemporary ceramic sculptures through public exhibitions and the production of video and print media for the dissemination of academic knowledge

3.1 Exhibition Installation

The research team utilized the space to hold the exhibition, titled the Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The "Beauty of Family Relationships" Series, at the 7th Cycle Building (Building 18), 1st floor, Faculty of Industrial Technology, Buriram Rajabhat University, from September 1st to 30th, 2566 (2023). The exhibition attracted a steady stream of visitors, with students in the field of Ceramics Technology and Design providing guided tours and explanations of the creative process and concepts behind the works. Most viewers were able to initially understand the concepts of the works through visual observation and could interpret the meaning of this creative series in a similar way, namely, the concept of family, parents, children, and the relationships within a family. In addition, brochures were produced for the exhibition, and a video was created showcasing all the steps in the work process. These were used to disseminate academic knowledge to the wider public.

3.2 Aesthetic Evaluation by Ceramic Sculpture Experts

The aesthetic value of the created contemporary ceramic sculptures from Buriram volcanic stone powder: "The Beauty of Family Relationships" Series, was assessed by three experts specializing in pottery and ceramic sculpture.

The evaluation focused on the alignment of the creative outcomes with the intended objectives and the artistic merit of the works.

The experts also provided feedback and suggestions regarding creativity, value, and other aspects that could lead to commercial applications. This feedback, resulting from the research, will be utilized in future endeavors to enhance the novelty of the works, develop artistic techniques, and establish a unique identity that inspires the wider art community.



Figure 7 The Creative Ceramic Illustration and Exhibition



Figure 8: Summary of the Research Process

4. Integration of Research into Teaching, Learning, and Academic Services: This involves the knowledge sharing and the development of local materials for contemporary ceramic sculpture. Researchers, the public, and students in the field of Ceramics Technology and Design collaborate, fostering a shared aesthetic experience.

From the participatory action research involving students from all academic years, it was found that students were able to integrate knowledge from various courses, both theoretical and practical. In the initial phase, they surveyed clay sources, tested for appropriate proportions, experimented with different forming techniques, and conducted trials with layered glazing until achieving satisfactory results in line with the research objectives. Each academic year was assigned specific responsibilities in the research process: First-year students were responsible for preparing raw materials, including clay bodies and glazes, mixing clay according to the correct proportions, and experimenting with coil or slab building techniques. They integrated skills from their introductory ceramics course into this work. Second-year students were responsible for testing the physical properties of the clay bodies and experimenting with pinch and press forming techniques. They effectively integrated skills from their hand-building course into their work. Third-year students were responsible for overseeing the production of clay bodies and glazes, including glazes derived from volcanic powder from Buriram province, and the mixing of various colored glazes for layering and decoration. They also handled glaze dipping, integrating knowledge from their clay body and glaze course. The student research assistants demonstrated high proficiency in their tasks. Fourth-year students were responsible for wheel throwing and the planning, loading, and firing of glazed pieces, as well as unloading the kiln and preparing the workspace and equipment. They ensured that everyone understood their roles and responsibilities, integrating knowledge from

their wheel throwing and kiln firing courses. The students worked effectively alongside the research team, coordinating and collaborating seamlessly throughout all stages, resulting in the successful completion of the project.

Discussion

The research project, "The Creation of Contemporary Ceramic Sculptures from Buriram Volcanic Stone Powder: The "Beauty of Family Relationships" Series. The concept and inspiration were drawn from the experiences of family members who, having grown up in a warm and loving household, yearn to return home after work or school and engage in activities with loved ones. Family relationships begin with the love and warmth between spouses, and with the arrival of children, this bond extends to them as well. It becomes a relationship between parents and children, where everyone can be both a giver and a receiver, connected by blood ties. The family is thus a source of love and warmth, more significant and enduring than any other relationship.

In the development and refinement of this project, the physical properties of clay bodies and glazes incorporating Buriram volcanic stone powder were tested to determine their suitability for creating contemporary ceramic sculptures, titled "The Beauty of Family Relationships" series. The results revealed that the optimal clay body composition was Formula 6, which consisted of a 50/50 ratio of local Ban Kruat clay and ball clay. Further experimentation involved combining 100 parts of Ban Kruat clay with 15% basalt stone powder, resulting in a unique color and texture. This mixture proved to be well-suited for wheel-throwing and exhibited no post-firing slumping, even when used to create large pieces.

Regarding glazes, Formula 6 proved to be optimal, with a composition of 60% basalt stone powder, 30% feldspar, and 10% ball clay, fired at 1,230 degrees Celsius. The resulting glaze exhibited a lustrous, opaque finish with a glossy

black color and excellent consistency. This formulation successfully transformed basalt stone into a high-value material.

The practical work in design and creation, both in terms of form and methodology, revealed unique and distinctive characteristics in the creative process. The resulting artworks were not limited by shape, form, or decorative techniques. The researcher was able to freely design and create a diverse range of pieces according to their imagination and intended purpose, while adhering to the guiding principles inspired by the Beauty of Family Relationships. These contemporary ceramic sculptures prioritize aesthetics and beauty, resulting in a new form of sculptural expression that harmonizes aesthetic value with the functional purpose of each piece.

Conclusion

This research project involved the development and testing of clay bodies and glazes incorporating volcanic stone powder from Buriram province. The goal was to determine their suitability for creating contemporary ceramic sculptures in the series "The Beauty of Family Relationships." By combining these materials with modern design approaches, the research team aimed to develop distinctive ceramic products characterized by innovative concepts, materials, and functionality, while showcasing a harmonious blend of decorative techniques and production processes.

Based on this concept, the research team adapted, interpreted, and expressed their findings through contemporary ceramic sculptures. They successfully enhanced the properties of local materials, achieving both aesthetic value and functionality. The resulting sculptures, adorned with harmonious decorative elements, represent valuable creative expressions. This artistic endeavor was integrated into teaching, learning, and academic services, aligning with the content of various courses across different academic years. This integration fostered mutual appreciation among

participants and facilitated collaborative work within a supportive network, culminating in the creation of these artworks. By utilizing the unique characteristics of clay bodies and glazes derived from Buriram volcanic stone powder, the team explored design adaptations, reductions, and new compositional arrangements. This led to the development of innovative functionalities and aesthetically pleasing forms. The sculptures themselves remain unbounded by limitations in shape, form, or appearance. The designers' skills, expertise, and experiences were harnessed to create works of art that reflect limitless imagination.

Recommendation

1. It is recommended to hold exhibitions of the contemporary ceramic sculptures in various locations. This would serve to disseminate and amplify the tangible impact of this research on the advancement of the ceramics field in Thailand, promoting recognition according to international standards. These exhibitions would showcase the concepts, ingenuity, and meticulous craftsmanship embodied in the creative works resulting from this research. The public would gain knowledge and understanding of the aesthetic beauty inherent in these pieces, potentially inspiring further creative development.

2. It is advisable to pursue copyright and intellectual property protection for the unique

clay bodies and glazes, as they possess distinct characteristics compared to other ceramic works. The outcomes of this research could be leveraged for the benefit of the province and local communities in commercial applications, ensuring the continued impact of this work into the future.

Acknowledgments

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