



# Alloys of Clay and Metal in Fine Art

Indah C. Angge<sup>1</sup>,\* Wening H. N. Ruci<sup>1</sup>

<sup>1</sup>Universitas Negeri Surabaya, Surabaya, Indonesia

\*Corresponding author: indahangge@unesa.ac.id

**Abstract.** This research focuses on making fine art from clay alloys for ceramics with non-precious metal types. The purpose of this research is to provide new perspectives for art students to be able to work from ceramic media combined with metal. So, there is a novelty side as well as an alternative material in the combination of the use of media/materials for Arts of two-dimensional or Arts of three-dimensional. For art students and general public who are interested in making works that combine ceramics and metals, it is also meant to add references to fine art materials. This study uses research development research methods R&D. Data collection was carried out by testing clay and metal alloys. From the trials carried out there will be a blend of clay for ceramics and metal which has good results in metal craftsmen being able to stick to clay, so that it can be a reference for art students or anyone interested in working with clay or ceramic media combined with metal.

**Keywords:** Clay, metal, fine art.

## 1 Introduction

Clay as a raw material for making ceramics is widely available in Indonesia. It is a naturally abundant resource that must be handled wisely. One of those uses is turning it into great art, which will increase the value of the clay by enhancing the value of the clay used to create the work. There are two ways to improve value. The first is to transform clay art into ceramic art, in which case the cost multiplies greatly. The second value is the transformation of clay, which at first resembles soil, into excellent art that is intriguing, attractive, and heart-pleasing.

In Indonesia, the process of creating ceramics from clay is very common. It is evident that Indonesia has regions that produce ceramics such as Kasongan ceramics in Yogyakarta, Dinoyo ceramics in Malang, and other regions that produce ceramics, including Kalimantan and Lombok. Each region that makes ceramics has its own characteristics which can be seen from the shape of the ceramics. Visible and well-known Indonesian ceramic artists are Timbul Raharjo from Yogyakarta, Noor Sudiwati from Yogyakarta, Ponimin from Malang, Keramikus F. Widayanto from Bandung, and Muchlis Arif from Batu. Likewise, the forms of the works of these Indonesian ceramic artists also differ in their respective concepts and visual forms. In order to create ceramic masterpieces, each artist has a certain method [4].

Metal is an element that is obtained from nature, especially from the soil. The raw material for metal comes from ore which is processed by melting it in a blast furnace with temperatures up to 1600 degrees Celsius and then pouring it into a ready-to-use form. available as a semi-finished product. In this study, researchers used 3 types of

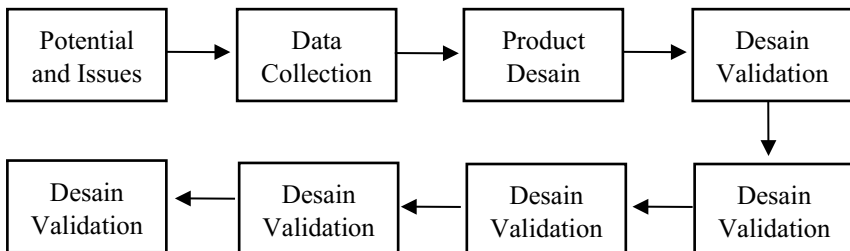
metal, including aluminum metal is a type of stainless metal, this aluminum application is usually for items used to make food.

Besides the aluminum material being lightweight and rust-resistant, this material is also used in household furniture, such as pans and other kitchen utensils. Aluminum has a melting point of 657 0C, but aluminum has a layer called aluminum oxide which has a melting point of 2020-2050 0C. Brass metal is the result of mixing zinc metal and copper metal, with a copper content of approximately 60-96, the rest is zinc. Brass metal is easy to cast, solder, and weld and is resistant to air and water conduction. Most brass melts at 900°C, but the higher maximum temperature reduces errors and makes casting brass easier. There are several types of brass, such as (1) Liquid brass (a type that is fused and separated from the melt). (2). Brass frame (a special kind that matches and contrasts the design). (3) Special brass is a refinement made with the addition of certain metals that can be hammered into any desired shape, milled, plated, wired, and can be machined or cast without difficulty. The results of the brass handicraft industry are in the form of jewelry and other handicrafts. Copper metal is pink in color and has a melting point of 1083 °C and a boiling point of 2310 °C. Crafts made of copper include home furnishings and decorations as well as jewelry [5-8].

According to the research, ceramics are well-known and extensively viewed in society. Therefore, people do not get bored in appreciating ceramics, it is necessary to have new innovations regarding the manufacture of ceramic works. The innovation that was carried out was by combining ceramics and metal for a fine art.

## 2 Method

This research was conducted used using the research and development (R&D) method from Sugiono. the test results are recorded until the results of a mixture of clay and metal can be seen which can be used as a reference in the creation of 2-dimensional and 3-dimensional fine art. The stages of this research were modified into seven stages considering that this research did not reach mass production. the following are the stages of R&D research according to Sugiono that will be carried out [1-3,11].



**Fig. 1.** Adjusted Research Scheme

According to Sugiyono [12], research and development (R&D) is a basic research activity to obtain information on user needs (needs assessment), then proceed with development activities (development) to produce products and examine the effectiveness of these products. Research development consists of two words, namely research and development. The first activity is conducting research and studying literature to produce certain product designs, and the second activity is development, namely testing the effectiveness and validating designs that have been made, so that they become tested products and can be utilized by the wider community [9,10].

Based on the above opinion, it can be concluded that aims to develop products that begin with needs research and then develop them to produce a product that has been tested [13]. The results of product development include media, learning materials, and learning systems. This study uses the type of research and development (R&D) [14]. In this research, product development takes the shape of experiments on clay and metal alloys.

### 3 Results and Discussion

This Research used clay from two cities, namely Sukabumi clay and Malang clay. While the metal materials used are non-precious metals, namely: aluminum metal, brass metal, and copper metal in the form of thin plates with a thickness of 0.2mm and 0.5mm. Researchers control and measure, and each of the results will be identified by describing the results of what is seen in the two combined materials. In the process, the considered success is if the metal material can melt and stick firmly to the clay.

The experiments carried out were as follows: First, using clay from Sukabumi and Malang, each plate was made with a length of 12 cm, a width of 12 cm, and a thickness of 1 cm. After drying naturally for 3 days there were 5 slabs of Sukabumi clay that cracked because the water content in the slabs was still too much. This is

different tablets which and have



from the clay from Malang look quite good no cracks.

### Fig 2. Clay and metal slabs

The next step is to carry out the process of burning biscuits on Sukabumi clay, each of which has been placed aluminum metal plates, brass metal, and copper metal. Different treatments are given for the combustion temperature, where the results can be seen from the treatment carried out on the test pieces and the results obtained. The visible results are recorded and described in detail.

Next, make the biscuit ceramic plates from clay originating from the city of Malang. Here also placed on the surface of the clay plate, namely metal plates of brass, copper, and aluminum. From the test results obtained, verification was carried out on the material expert to get input and then another trial was carried out in accordance with the input directions from the material expert. The process and results of burning are seen and recorded in detail so that when students or artists are going to make fine art from a mixture of clay and metal media, they can do it correctly and obtain the same results.

## 4 Conclusion

Based on the research conducted, clay for making 2 and 3-dimensional fine art can be combined with non-precious metals such as copper, brass, and aluminum. Effects that arise from the results of trials can be executed by artists or ceramists in the creation of fine art. Utilization or use of these effects depends on each artist's or ceramicist's individual creativity. The results of the trials carried out can be a reference, especially for UNESA fine arts students and ceramicists in general, in making two-dimensional and three-dimensional ceramic works.

## References

1. P. Oktavianawati: *Jajanan Tradisional Asli Indonesia*. Badan Pengembangan dan Pembinaan Bahasa, Jakarta Timur (2017).
2. I. Setiawan, F. Santoso, D. K. Homan: *Perancangan Character Merchandising Berbasis Kudapan Tradisional Indonesia*. *Jurnal Desain* 5(3), 206-214 (2019).
3. A. D. Tarigan, D. Priani: *Perancangan Branding Lupis Cencil Indonesia*. *Lucid. Formosa Journal of Multidisciplinary Research* 1(3), 709-718 (2022).
4. A. B. Marwanto: *Eksperimentasi Penciptaan Karya Keramik Monumental dengan Tungku Rekayasa*. *Brikolase: Jurnal Kajian Teori, Praktik dan Wacana Seni Budaya*. Vol. 1, No. 1 (2009).

5. N. S. Sukmadinata: *Metodologi Penelitian Pendidikan*. Remaja Rosdakarya, Bandung (2005).
6. Sudarno, I. W. Sumarinda: *Teknik Eksplorasi*. Departemen Pendidikan dan Kebudayaan, Jakarta (1989).
7. Muchlis Arif. *Seni Keramik*. Unesa Universty Press, Surabaya (2002).
8. I. C. Angge: *Dasar-Dasar Kriya Logam*. Unesa University Press, Surabaya (2016).
9. Indah Chrysanti Angge: *Kriya Logam*. Penerbit Graniti, Surabaya (2021).
10. S. H. Sunaryo & A. S. Bandono: *Teknologi Kerajinan Logam 1*. Departemen Pendidikan dan Kebudayaan, Jakarta (1979).
11. Purwanti & Sulbi: *Kriya Seni Berbentuk Bonsai Kontemporer Berbahan Dasar Logam*. Surabaya: *Jurnal Pendidikan Seni Rupa* 05(01), 55–6 (2017).
12. Sugiyono: *Metode Penelitian Kuantitatif Kualitatif dan R & D*. Alfabeta, Bandung (2009).
13. Sugiyono: *Metode Penelitian Pendidikan Pendekatan Kuantitatif, Kualitatif, dan R&D*. Alfabeta, Bandung (2012).
14. Sugiyono: *Metode penelitian Kuantitatif Kualitatif dan R & D*. Alfabeta, Bandung (2014).

**Open Access** This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

