

**Title :** Fabrication of Ceramic Jewelry Coated with Thermochromic Powder-Embedded Resin.

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## ABSTRACT

Ceramics are materials that humans have known and used since ancient times due to their versatile formability, heat resistance, and the ability to create diverse surface textures and colors through firing and glazing processes. Currently, ceramics have become increasingly popular in the jewelry industry. This study aimed to compare the quality of hand-made jewelry forming or molding from two types of ready-made ceramic clay: porcelain and stoneware, and to analyze their suitability for jewelry production, which involves small-sized pieces requiring high strength. Both types of clay consist of major oxide components, including silicon dioxide ( $\text{SiO}_2$ ) and aluminum oxide ( $\text{Al}_2\text{O}_3$ ), which serve as the primary structural framework of the ceramic body. They also contain fluxing agents such as potassium oxide ( $\text{K}_2\text{O}$ ) and sodium oxide ( $\text{Na}_2\text{O}$ ), which promote vitrification, as well as iron oxide ( $\text{Fe}_2\text{O}_3$ ), which affects color and physical properties. The obtained sample pieces were coated with resin to evaluate the feasibility of using resin as an alternative to glaze firing. The study utilized ready-made ceramic clay supplied by Nara Co., Ltd. The two clay types were molded into rings and pendants and heated at  $950^\circ\text{C}$  with varying firing durations. The results showed that the porcelain pieces exhibited a white color and a finer microstructure after heating, whereas the stoneware pieces displayed a light yellow or gray color and a comparatively coarser structure. Increasing the heating duration resulted in only slight differences, while overall strength was maintained. Chemical analysis using Scanning Electron Microscopy with Energy Dispersive X-ray Spectroscopy (SEM-EDS) revealed the presence of silicon and aluminum as the main elements, corresponding to quartz ( $\text{SiO}_2$ ) and kaolinite clay minerals. This study concluded that the samples possess compositions and structures characteristic of aluminosilicate ceramic materials. Additionally, the presence of porosity and clearly

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defined grain boundaries indicated incomplete densification at 950 °C. Therefore, the samples were probably suitable only for small, lightweight jewelry-making applications. However, further optimization of the sintering conditions is recommended to improve its mechanical strength for long-term wear.