IN THE LABS

Stone that Flows

RESEARCHING ANCIENT EGYPTIAN FAIENCE AND GLASS

BY PAUL VERHELST

Of all the materials used to craft objects in ancient Egypt, nothing catches the eye quite like Egyptian faience (ḥnt ṭḥenēt): “brilliance”) and glass (ḏn n ḫḏḥ [yēnēr-en-wedjeh]: “stone of the kind that flows”). From humble raw ingredients transformed through heat, ancient craftspeople worked faience and glass into objects desired by all levels of Egyptian society.

EVEN THOUGH FAIENCE production developed during the Predynastic Period (ca. 4000 BCE), while the introduction of glass production occurred later during the New Kingdom (ca. 1500 BCE), these materials share some characteristics.

Both faience and glass are vitreous materials made from a combination of silica, soda or potash, and lime, with their color coming from a small quantity of certain elements, such as copper or cobalt. Although the raw ingredients of faience and glass go through different processes, both rely on firing as part of their production. Craftspeople may have even shared technical knowledge for achieving and maintaining the high temperatures needed to create these materials. It is possible that faience and glass developed as man-made versions of semi-precious stones like turquoise and lapis lazuli; however, the versatility and malleability of these materials made them valuable in their own right. Faience and glass even gained symbolism as the ancient Egyptians associated them and the objects made from them with light, rebirth, and fertility.

Unfortunately, no known textual information survives to tell us about the processes that went into making faience and glass in ancient Egypt. To fully understand the steps that went into making these materials, researchers interpret the archaeological record, rely on experiments to replicate the production process, and analyze faience and glass artifacts.

Through my involvement with the Center for the Analysis of Archaeological Materials (CAAM) at the Penn Museum, I had the chance to make some faience pieces. This experiment involved creating a faience paste by mixing dry ingredients and water, then shaping the result into different objects. This step alone gives insight into the challenges of working the paste as there needs to be just the right ratio of water to dry mixture to create objects that hold their shape. Next, I fired the objects in a lab kiln for a few hours at 900 degrees Celsius (1,652...
degrees Fahrenheit). This process is crucial for melting the edges of the silica particles into a single mass and evaporating water to bring the colorant to the surface of the object. After the firing was over and the kiln cooled, it was an exciting moment to see the transformation from gray paste to blue pieces of faience, some of which even achieved a glossy, self-glazing finish. Overall, this experiment has expanded my understanding of faience production and will help guide a class activity for students enrolled in the CAAM course Food and Fire: Archaeology in the Laboratory.

My interest in faience production owes much to my current experience studying glass production in ancient Egypt through a project directed by Vanessa Muros of the UCLA/Getty Conservation Program. The goal of the project is to understand the practice of glass-making and glass-working at the site of Tell el-Amarna, Egypt, by analyzing glass artifacts from the Egyptian Collection at the Penn Museum. Unlike faience, glass production goes through a primary stage in which ingredients are mixed and fired multiple times to create raw glass (glass-making), followed by a secondary stage of heating the raw glass to form objects (glass-working). Under the guidance of Vanessa and the conservators at the Penn Museum, I am learning different scientific techniques that will expand our understanding of the primary and secondary stages of glass production. These techniques range from different levels of microscopy for seeing evidence of production processes within the glass body to analytical techniques for detecting the presence of certain elements, including trace elements. As I learn more about these techniques, I hope to use this knowledge to contribute to this glass production project and future research on faience, glass, and other materials.

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