

Ceramic Glazes

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What are glazes?

Glazes are glassy materials applied as a thin layer to the outside of clay ceramics. They are applied at room temperature and fused to the clay by firing between 1100-2350°F.

Why are ceramics glazed?

- to prevent water absorption for ceramics used with food
- to create a durable surface and increase strength of the clay object
- to create an interesting surface with visual or tactile appeal

What are glazes made of?

Glazes have three major components: glass formers, stabilizers, and fluxes. Silica (SiO_2) is the major glass former and has a high melting temperature of 3110°F. Adding fluxes to silica makes the mixture melt and flow more easily at lower temperature, which saves energy when firing. Stabilizers, like alumina (Al_2O_3), are added to prevent the mixture from becoming too fluid and sliding off vertical surfaces during firing.

Where does the color come from?

Small amounts of certain ceramic compounds are added to create colors in glazes. For example, copper oxides commonly produce reds, greens, and metallic lusters. Iron oxides can produce yellows, browns, greens, blues, and black. Colorants can be mixed to create new colors.



The transparent green (“celadon”) glaze (left) and yellow glaze (right) both get their color from different types of iron oxide.^{1,2}

Crystalline Glazes

By optimizing glaze chemistry and cooling at a controlled rate during the end of glaze firing, it is possible to grow crystals in glazes. These crystals often appear as mesmerizing patches with intricate patterns. They can be centimeters in size.



Vase with blue crystalline glaze (left) and crystalline patches up close (right)³

Crazing: Glaze Defect or Art?

Crazing is a phenomenon that occurs when there is a mismatch in the coefficients of thermal expansion of the glaze and clay body. The glaze contracts more than the clay body during cooling, which causes the glaze to crack all over to relieve the stress. Because crazing weakens the clay object and may be considered unsanitary for use with food, it is usually considered a glaze defect. However, some ceramic artists intentionally cause crazing to create intricate surface texture, such as the crazing on the cup to the right.⁴



Please see *The Complete Guide to High-Fire Glazes* by John Britt for more information.

1. <https://i.pinimg.com/474x/31/7c/f9/317cf9dd49958759eb9a3d4bd155e6e5-raku-vii.jpg>
2. https://digitalfire.com/4sight/glossary/glossary_celadon_glaze.html
3. https://digitalfire.com/4sight/glossary/glossary_crystalline_glazes.html
4. <http://www.floriangadsby.com/gallery>