Duochrome cosmetics are helping consumers create dramatic new looks. Image Source: Unsplash user Bernard Osei

Duochrome may sound like something one would find in the automotive industry, but in recent years, it's made its way into makeup bags around the world. Duochrome refers to a type of color changing makeup that doesn't **actually change colo**r. Instead, its appearance changes based on the angle that it's viewed. It's a dramatic look that's made its way onto many runways through the years. However, the creation of this makeup is a complex process and its ability to interact with light is key; creating colors that appear to change based on how they're viewed requires developing a precise, exacting formula.

There's a lot of room for error in creating these cosmetics, as development hinges on interference pigments. These pigments "interfere" with an existing color and if used incorrectly, the end result could be lackluster. As such, base color is the key to establishing a cosmetic that uses interference pigments to their full advantage. By using spectrophotometric color measurement, cosmetics manufacturers can develop a base color that works perfectly with interference pigments and move that color into mass production.

Interference pigments allow for the creation of dynamic cosmetics that appear to change based on angle. Image Source: Unsplash user Raphael Lovaski

Creating Multifaceted Colors With Interference Pigments

Duochrome makeup makes use of two distinct colors to create a changeable look. There's the base color, which is the color that is seen all the time. Then, there's the interference pigment, which might only be viewed from certain angles. Interference pigments have been in use in cosmetics since the 1970s to add new facets to an existing color providing a shimmer, color change or pearlescent appearance.[1] Some of the more common interference pigments added to cosmetics include:[2]

- **Mica powder:** Mica is commonly used as an interference pigment in some cosmetics due to its wide availability and relatively low cost when compared to other interference pigments.
- **Aluminum oxide**: Otherwise known as Alumina, this interference pigment has a crystalline structure that lends itself to a wide variety of effects in cosmetics.
- **Silica flakes:** Silica flakes are commonly used in conjunction with titanium dioxide to create a color shifting appearance. While many other products shift in shades of white, this type of mineral can be used to shift in warmer shades, like adding a bit of red to blue or some of peach to yellow.
- **Titanium/Iron dioxide:** These two minerals don't usually create a color effect themselves. Instead, they act as the carrier for effect colors, due to their excellent coverage and thickening abilities. They can also be used as whitening agents.[3]

These are just a few of the interference pigments, as there are virtually millions of minerals that can be used to add depth to certain cosmetics and combinations of these minerals can drastically change the end result of makeup.

In some cases, however, that end result could be unappealing. Consider an instance where a company decides to add a titanium oxide-based interference pigment to a light pink lipstick. The interference pigment could overtake the color, resulting in an end result that's simply white. As such, interference pigments need to be used in combination with a well-chosen base color to ensure they don't overpower that base color.

Spectrophotometers are critical for perfecting duochrome cosmetic formulations. Image Source: Unsplash user Element5 Digital

Using Spectrophotometers In Duochrome Cosmetic Creation

When creating a duochrome color, manufacturers want two colors to be represented, if not more. This can be a challenge, as overpowering the base may result in a situation where it disappears entirely. To create two separate, distinct color appearances based on angles, a very specific color discovery process must be followed. Of particular importance is **using spectrophotometric technology** to establish a suitable base. Using a spectrophotometer, you can establish a base color with the right shade and level of opacity necessary to successfully interact with your chosen interference pigments. Through objective color measurement, you can closely analyze base behavior and establish an ideal formulation.

Spectrophotometers minimize the need to continuously **experiment with various color combinations** as well as various cosmetic textures, as it allows a company to establish a perfect base quickly. This is critical in duochrome makeup, as the interference pigments used in this makeup can be costly and even scarce. By minimizing the time necessary to discover the perfect base color, you are able to enhance the efficiency of the formulation process and eliminate unnecessary material

waste. Once a product is in full-scale production, spectrophotometers can be used to continuously monitor color within the production line to ensure that every batch is correctly formulated.

HunterLab Innovation

HunterLab has been at the forefront of color measurement technology for over 60 years. Today, we offer a comprehensive line up of **portable, benchtop, and on-line spectrophotometers** ideally suited to the needs of the cosmetics industry. By combining state-of-the-art technologies with use-friendly design, our instruments offer the highest degree of accuracy and precision. Contact us to learn more about how our renowned spectrophotometers and customizable color measurement software packages can improve your color creation process.

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