

MAKING OF CARBON BLACK

CONCEPT Carbon black, also known as acetylene black, channel black, furnace black, lamp black or thermal black, is one of the darkest and most widely spread materials, known for its ability to make products stronger, deeper in color and longer lasting. In its pure form, it is a fine black powder composed of elemental carbon.



BACKGROUND

In earlier civilizations, undesired burn-off soot was used in ancient Egypt and China as a black pigment for writing letters. The modern version of this is carbon black, invented by Joseph C Krejci, which has been used widely since 1864 for its simple production and excellent hiding power. The name carbon black is used as a generic name for black pigments that are made from the partial burning or carbonizing of natural gas, oil, wood, vegetables and other organic matter. In 1864, the process was developed in America for a black more suitable for watercolor. It was widely employed in 1884. The American process used natural gas as the raw material. The smoky flame resulting from the burning of natural gas was first directed to cool revolving metal drums. The black deposits were then removed from the sides of the drums with scrapers. The resultant powder was of a finer grain than other blacks allowing it to spread better in watercolor. It was a stable pigment, unaffected by light and air.

REAL WORLD CONNECTIONS

Monolith, a leader in clean carbon black production, signed a collaboration agreement and letter of intent (LOI) with The Goodyear Tire & Rubber Company, one of the world's largest tire companies. As part of the agreements, Monolith expects to collaborate with Goodyear on the development and potential use of clean carbon black produced at its expanding Olive Creek facility in Hallam, Nebraska.

Make sure it measures up

FORMULAS/DATA

Carbon black is a black residue that results from the incomplete combustion of a hydrocarbon fuel such as oil or gas with a limited supply of combustion air at temperatures of 1320 to 1540°C (2400 to 2800°F). The unburned carbon is collected as an extremely fine black fluffy particle, 10 to 500 nanometers (nm) in diameter.

Carbon black appears black because it reflects very little light in the visible part of the spectrum, with a visual reflection near zero.

EXAMPLES

Nanoparticle - Among manufactured or engineered nanoparticles, carbon black has the largest production worldwide and is also an occupational respiratory hazard commonly seen in the rubber industry.

Uses - Carbon black is mainly used as a reinforcing filler in tires and other rubber products. In plastics, paints, and inks, carbon black is used as a color pigment.

APPLICATION / EXPERIENCE

Carbon black, also known as PBk7 as a pigment, still has a presence in the art-making community. Today, PBk7 is still made by burning coal or natural gas, but is traditionally derived from carbonizing plant matter, like in the production of charcoal. Paints made with PBk7 are usually very opaque and have a high tinting strength thanks to the small, dense pigment particles. PBk7 can range from neutral to cool in temperature.



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