

Periodic Graphics

A collaboration between C&EN and
Andy Brunning, author of the popular
graphics blog *Compound Interest*

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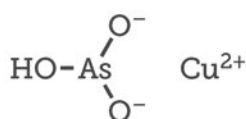
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Brunning's work, go to
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6 chemical stories of colors through time



Through the centuries, artists have turned to different pigments and dyes to add color to their works. Here we take a closer look at the chemistry and history of six colorants.

Scheele's green

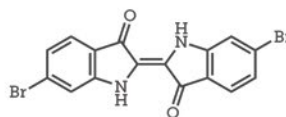


Copper arsenite

Beginning in the late 1700s, manufacturers used Scheele's green to make green fabrics and wallpaper. In damp wallpaper, mold metabolized copper arsenite to form toxic arsine gas.

Historians link wallpaper containing Scheele's green to the death of Napoleon, though evidence for this is inconclusive.

Tyrian purple

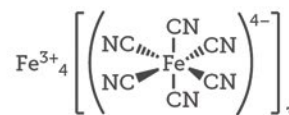


6,6'-dibromoindigo
(primary component)

Ancient cultures extracted Tyrian purple from several sea snail species' mucus.

One ounce of dye required 250,000 snails, making Tyrian purple extremely expensive. The technique for making the dye was lost in the 1400s. Scientists discovered a way to create the dye in the early 2000s.

Prussian blue

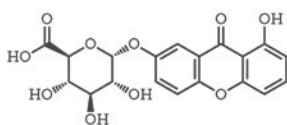


Iron(III) ferrocyanide

Alchemists discovered Prussian blue by accident in the early 1700s. Various artists, such as Pablo Picasso, used the affordable pigment. Using it with photosensitive paper creates blueprints.

Prussian blue can treat radioactive thallium and cesium poisoning—and cause blue poo in the process.

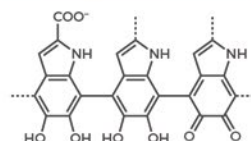
Indian yellow



Salts of euxanthic acid

In the late 1800s, sources claimed that Indian yellow was made from the concentrated urine of cows fed with only water and mango leaves. In 2018, scientists confirmed that it was made from urine; they identified hippuric acid, a common metabolite in cow pee, in Indian yellow samples.

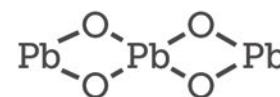
Sepia



Eumelanin (fragment shown)

Cephalopods such as cuttlefish and squid produce an ink, sepia, based on eumelanin. Eumelanin is a form of melanin, the pigment in human skin. Artists and writers use sepia in ink, and it also lent its name to a treatment that converted silver to silver sulfide in black-and-white photos to yield warmer tones.

Minium



Lead tetroxide

People have used minium as a pigment since the Roman Empire. Medieval painters known as miniators used it to decorate manuscripts, and the term *miniature* was coined for these small illustrations. Later, manufacturers used it in rust-proof primer paints, but this use is now limited because of lead's toxicity.

