

Periodic Graphics

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

More
online

To see more of
Bunning's work, go to
compoundchem.com.
To see all of C&EN's
Periodic Graphics, visit
cenm.ag/periodicgraphics.

Tin years of Periodic Graphics



A 10-year anniversary is traditionally marked with tin gifts. To celebrate a decade of Periodic Graphics, we look at element 50 and some of its important uses in our lives.

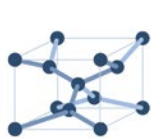
Isotopes and allotropes

Tin has 10 stable isotopes—the most of any element.



Source: Commission on Isotopic Abundances and Atomic Weights.

The allotrope β -tin is stable at and above room temperature. It transforms into brittle α -tin at 13.2 °C, or lower if there are impurities.



β -Tin



α -Tin

Some historians claim that in 1812, the cold transformed the tin buttons on uniforms in Napoleon I's army to crumbly α -tin, contributing to the army's defeat. But there are no eyewitness accounts to support this claim.

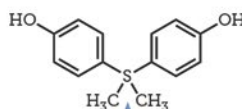


Tin and cans

Though tin cans bear the element's name, modern cans are made of stainless steel. Manufacturers used to use a thin layer of tin plate to prevent corrosion. But today, many cans have a plastic coating instead—often made from bisphenol compounds.



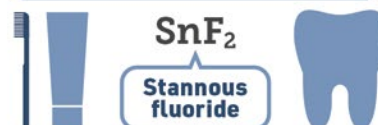
Stainless steel



Bisphenol S

Selected uses of tin compounds

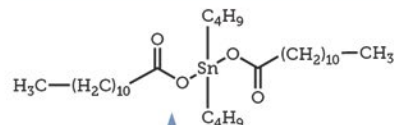
Toothpaste



Many toothpastes use stannous fluoride, a source of fluoride and tin ions. Fluoride ions help prevent tooth decay, and tin ions help prevent gingivitis and tooth sensitivity.

Plastics

Dibutyltin dilaurate stops oxidative degradation in polyvinyl chloride (PVC) and some other plastics.



Dibutyltin dilaurate

Particle accelerators

The Large Hadron Collider's superconducting niobium-tin magnets focus proton beams to increase the particle collision rate.



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