Tin (Sn)

Element 50 — Complete Summary

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50
Sn
Tin
118.71

Key Properties

Atomic Mass	118.71
Category	Post-Transition Metals
State at 20°C	solid
Melting Point	231.928°C
Boiling Point	2586°C
Density	7.31
Electron Config	[Kr] 4d105s25p2
Electronegativity	1.96
Year Discovered	Ancient
Discovered By	Unknown

✨ Did You Know?

1. Its chemical symbol, Sn, comes from its Latin name, 'stannum'.
2. When a bar of tin is bent, it makes a characteristic crackling sound known as the 'tin cry' or 'tin shriek'.
3. Below 13.2°C (55.8°F), pure tin can slowly transform into a powdery grey form in a process called 'tin pest', which caused organ pipes in old European churches to crumble in cold winters.
4. The first 'tin cans' for food preservation were actually made of iron plated with a thin layer of tin to prevent rusting.
5. Bronze is an alloy of copper and tin, and its discovery marked the beginning of the Bronze Age.

👁 APPEARANCE
Tin is a soft, silvery-white, malleable metal.

🦸 SUPERHERO PERSONA
"The Tin Soldier, the classic hero who protects food from corrosion and joins with copper to create the Bronze Age."

🔗 EVERYDAY CONNECTION
Tin is found in the tin can used for preserving food.

🎬 POP CULTURE
Tin is remembered as the Tin Woodman from The Wizard of Oz.

Tin: The Versatile Metal of Alloys and Coatings

Tin is a soft, silvery-white metal that bends easily. One of its quirks is something called allotropic transformation: below 13°C, tin slowly turns into a brittle, gray powder, a problem known as “tin pest.” Luckily, at normal temperatures, tin is stable and extremely useful, especially for coatings and alloys.

Why Is Tin Useful?

Tin has been important for thousands of years thanks to its corrosion resistance and ability to form alloys.

Corrosion Protection: Tin is used to coat other metals so they don’t rust—like in “tin cans,” which are actually steel coated with tin. Its shiny surface also makes it popular for decorative items.

Alloys: Tin is a star ingredient in alloys:

Bronze (copper + tin) gave its name to the Bronze Age, transforming tools and weapons.

Solder (tin + lead) is used in electronics to join components together.

Pewter and phosphor bronze are used in tableware and instruments.

Niobium–tin alloys are used in superconducting magnets.

Glassmaking: Modern window glass is made by floating molten glass on a bath of molten tin, producing sheets that are perfectly smooth and flat.

Other Uses: Compounds of tin are used in ceramics, gas sensors, and fire-retardant plastics.

Biological Role & Natural Abundance 🌱

Tin has no known biological role in humans, though it may be essential for some animals. Pure tin is non-toxic, but organo-tin compounds are poisonous and were once used in ship paints before being banned for harming marine life.

Tin is mainly obtained from the ore cassiterite (SnO_2). Most of the world’s tin is mined in the “tin belt” of Southeast Asia (China, Thailand, Indonesia) and parts of South America. It is produced by heating the ore with coal in a furnace.

History of Discovery 📜

Ancient Origins: Tin has been used since at least 1500 BC. Objects made of tin have been found in Egyptian tombs, and it was also used in China and South America.

The Bronze Age: The discovery that mixing copper with tin produced bronze changed human history. Bronze was harder and stronger than copper, allowing for better tools, weapons, and art, and it helped launch an entirely new era of civilization.