Gold (Au)

Element 79 — Complete Summary

79
Au
Gold
196.967

Key Properties

Atomic Mass	196.967
Category	Transition Metals
State at 20°C	solid
Melting Point	1064.18°C
Boiling Point	2836°C
Density	19.3
Electron Config	[Xe] 4f145d106s1
Electronegativity	2.54
Year Discovered	Ancient
Discovered By	Unknown

✨ Did You Know?

1. It is the most malleable of all metals; a single ounce (about 28 grams) can be beaten out into a translucent sheet covering more than 9 square meters (100 sq ft).
2. Its chemical symbol, Au, comes from 'aurum', the Latin word for gold, which means 'shining dawn'.
3. Nearly all of the gold on Earth came from meteorites that bombarded the planet over 200 million years after it formed.
4. Gold is so chemically unreactive that it never rusts and is found in its pure, native form in nature.
5. The world's oceans are estimated to contain about 20 million tons of gold, but it is too dilute to be profitably extracted.

APPEARANCE
Gold is a bright, yellow, soft, and dense precious metal.

SUPERHERO PERSONA
"The Golden Standard, the timeless, incorruptible hero, desired by all and the universal symbol of wealth."

EVERYDAY CONNECTION
Gold is found in a piece of gold jewelry like a wedding ring.

POP CULTURE
Gold is the object of desire in countless stories, from Jason and the Golden Fleece to Goldfinger.

Overview of Gold

Gold is a soft, dense, and chemically unreactive metal with a distinctive yellow color. It is one of the least reactive elements, unaffected by air or water, and resistant to most acids. Only a special mixture called aqua regia can dissolve it. Valued for its rarity, luster, and workability, gold has been treasured by civilizations for thousands of years.

Why Gold Is So Valuable

Gold's physical and chemical properties make it ideal for both decorative and practical applications:

Jewelry and art: Gold is the most popular metal for jewelry. Pure gold is 24 carats, but it is usually alloyed with other metals (such as copper or silver) to improve strength. It is also hammered into thin sheets as gold leaf, used for decoration in art and architecture.

Electronics: Gold is an outstanding conductor of electricity that does not corrode, making it perfect for protecting electrical contacts, connectors, and fine wires in computer chips.

Medicine: Gold alloys are used in dental fillings, while gold compounds have been employed in treating rheumatoid arthritis.

Catalysis: Gold nanoparticles have recently been discovered to act as efficient catalysts, useful in industrial processes such as producing adhesives and specialty chemicals.

Natural Occurrence and Production of Gold

Gold is one of the few elements often found in its pure metallic state. It occurs in veins of rock and as particles in alluvial deposits (riverbeds). About 1,500 tonnes of gold are mined annually, with major sources in South Africa, Russia, Australia, and China.

Although seawater contains vast quantities of gold, the concentration is so low that extraction is not economically feasible.

History of Gold

Ancient civilizations: Gold has been worked since prehistoric times. Egyptians, Mesopotamians, and many other ancient cultures crafted tools, ornaments, and religious artifacts from the metal. The burial mask of Pharaoh Tutankhamun, made around 1323 BC, famously contains around 100 kg of gold.

First coins: The earliest known gold coins were struck around 640 BC in the Kingdom of Lydia (modern Turkey) from electrum, a natural alloy of gold and silver. Under King Croesus (561–547 BC), Lydia produced the first coins of nearly pure gold.

Biological Role of Gold

Gold has no known biological function. It is considered non-toxic and inert inside the body, which is why gold alloys can be safely used in dentistry and medicine.