Copper Alloys in Coinage

Numismatists study both coins and medals; coin collecting is a popular hobby. The corrosion resistance of copper and its alloys means that coins and tokens are found that date back hundreds and sometimes thousands of years. Archaeologists use coins to help date excavation sites. The copper alloys used for coins can retain information such as names and dates, even after being buried in the soil for generations.

The Ancient Romans used a wide variety of copper/copper alloy coins, enabling their presence to be exactly dated since their coins showed the Emperor of the time and sometimes a mark indicating where the coin was minted.

Copper coins have been common in Britain since the 'new coinage' of 1797. They were worth their weight, one ounce, in copper and were called cartwheels. Silver coins, although originally made with silver, are now replaced in the UK by cupro-nickel alloys (75% copper, 25% nickel), which maintain the silver colour and associated value. Henry VIII famously saved silver by reducing the amount of it used in his own coinage, replacing it with copper. He was known as 'old copper nose' as a result.

Euros

When most of the countries in the European Union agreed to replace their currencies with the Euro, about 350,000 tonnes of old coins were taken out of circulation and recycled. The launch of the Euro required 27,500 tonnes of metal, of which 50% was copper.

Gold has been associated with high value coins for centuries and the 10, 20 and 50 Eurocent coins are made from a copper alloy called 'Nordic Gold', which consists of 89% copper, 5% aluminium, 5% zinc and 1% tin. No gold is present, but the alloy is durable and has an attractive gold colour that does not tarnish with time.

The 1 Euro and 2 Euro coins are bimetallic and have respectively outer and inner sections made from a nickel brass (75% copper, 20% nickel, 5% zinc), which also has an attractive yellow colour that does not tarnish. The silver-coloured parts of these coins are copper-nickel (cupronickel), as shown in the picture.

The copper alloy coins above are all recyclable. Another benefit of copper alloys is that they are antimicrobial, making them safer to handle.

The 1, 2 and 5 cent coins are steel with a copper coating, which gives good corrosion resistance.

The good electrical conductivities of copper and its alloys mean that coins are easily identified in vending and cash machines. The alloys have other useful properties such as:

- Tarnish and wear resistant
- Formable, easy to mint new coins
- Non-allergenic
- Easy to recycle - a sustainable material
- Antimicrobial

Copper's superior malleability allows clear images and distinct edging on all the coins. The latter is especially important for the visually impaired. Each coin denomination has a separate edge design to facilitate recognition.

Copper Development Association is a non-profit organisation that provides information on copper's properties and applications, its essentiality for health, quality of life and its role in technology. It supports education through a collection of resources spanning biology, chemistry and physics. These materials have been developed in conjunction with the Association for Science Education, and reviewed by teachers.

For more resources, visit www.copperalliance.org.uk/education.