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Valuable Metals from Recycled Electronics

Electronic devices such as cell phones, computers, televisions, and portable music players are made up of hundreds of products. Some of the products are valuable materials such as gold, copper, platinum, and silver.[[1]](#footnote-1) Although the amount of these materials is small, they can be reclaimed during the recycling process and reused in new products. Countries such as China, India, Malaysia, and countries in Africa have a high demand for the raw materials that can be recycled from electronic waste; much of the world’s e-waste is sold to them. However, these countries often have lax environmental standards to manage the toxic residue and waste that can also result from the recycling of e-waste. It is a growing problem that “the electronics industry provides us with the products that have become so essential to our modern way of life, and yet it also represents an area where the opportunities to operate in a sustainable way have not yet been properly realized.” Progress is being made as countries impose stricter standards on manufacturers for the safe disposal and recycling of their products when their useful life has ended (Hester and Harrison 2).

One valuable product found in electronics is tantalum. Tantalum’s main use is in the production of capacitors[[2]](#footnote-2) for use in cell phones, pagers, video cameras, and automotive electronics. It is useful for its resistance to corrosion and high melting point and is often used as a substitute for more expensive platinum. Due to its nonirritating properties, tantalum also has a market in the production of medical devices. In 1998 about $8 million worth of tantalum was recycled and reused. The value of tantalum is a driving force for its recycling (Cunningham 3).

Palladium is another valuable metal that can be recycled and reused from electronics. The use of palladium and metals with similar properties is widespread in modern manufacturing. The major use of palladium is in catalytic converters, which convert harmful automobile emissions into safer gases. Like tantalum, palladium is also used in the manufacture of medical devices as well as groundwater treatment. In electronics, palladium is used in ceramic capacitors, component plating, solder, and low-voltage electrical contacts. There is currently no universally used technique for recovering palladium from electronics, but effective methods are used by many recyclers.

Silver and gold are sometimes found on electronic circuit boards. Circuit boards are difficult to recycle because they generally have no usefulness after being removed from the electronic device, and they often contain hazardous materials. Many recyclers, though, have processes for removing the valuable silver and gold (and some other materials that have other uses) from the boards. The materials can then be sold for reuse. Recycling printed circuit boards can help companies comply with regulations regarding disposal of hazardous materials.

Bibliography

Cunningham, Larry D. Tantalum Recycling in the United States in 1998. Washington, D.C.: U.S. Department of the Interior U.S. Geological Survey, 1999.

Hester, Ronald E. and Roy M. Harrison. Electronic Waste Management: Design, Analysis and Application (Issues in Environmental Science and Technology). London: Royal Society of Chemistry, 2009.

1. Other materials used in the manufacture of electronic products include minerals like chromium, selenium, and cobalt. More than 30 different metals and minerals are used in the manufacture of an average desktop computer. [↑](#footnote-ref-1)
2. A capacitor is an electrical device characterized by its capacity to store an electric charge. [↑](#footnote-ref-2)