E-WASTE

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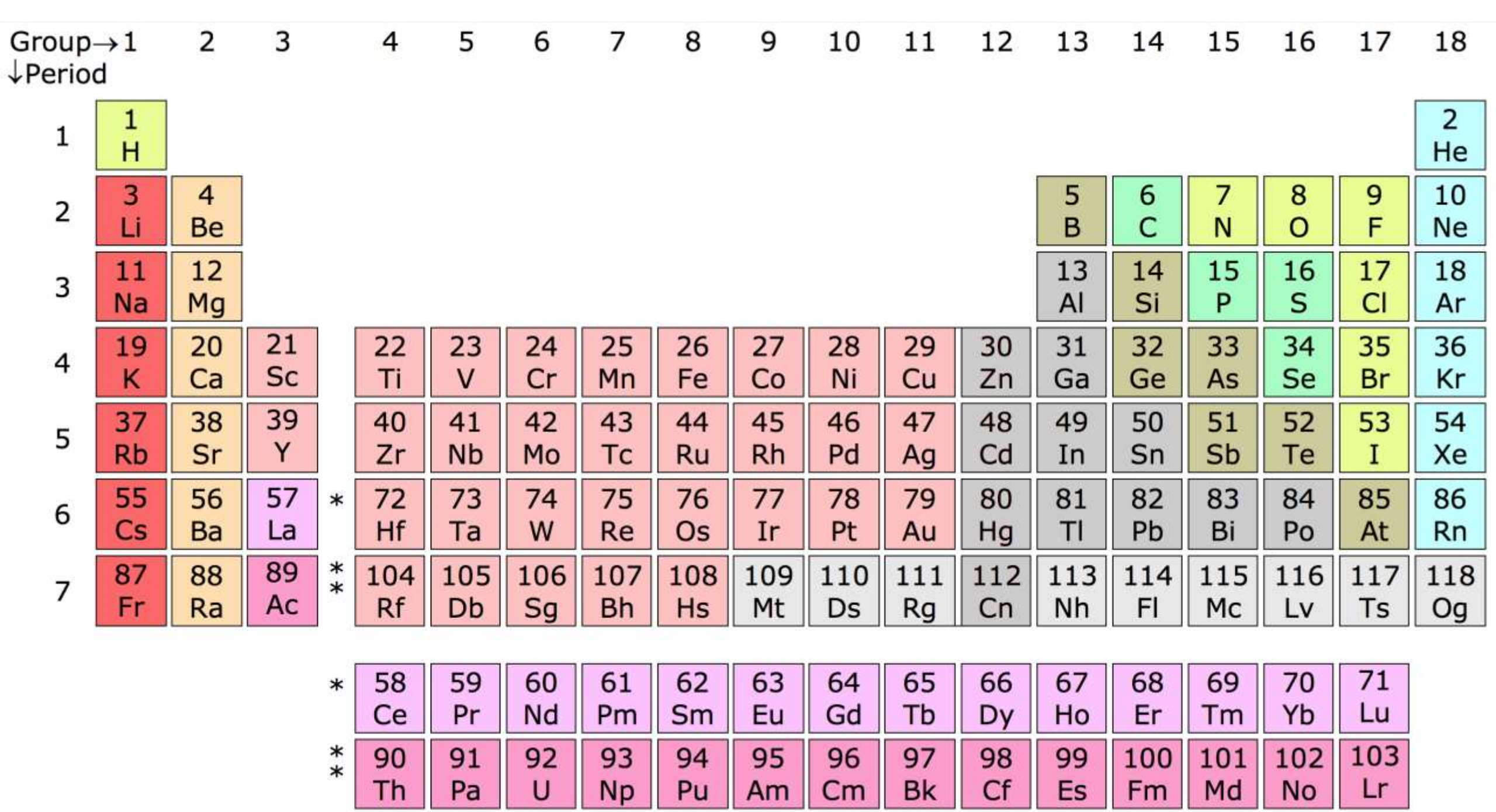
Definition. What is e-waste?.

Overview

Every year millions of electrical and electronic devices are discarded as products break or become obsolete and are thrown away. These discarded devices are considered e-waste and can become a threat to the environment and to human health if they are not treated, disposed off and recycled appropriately.

What are the some products or raw materials use in manufacturing these electrical and electronics devices

1. Copper
2. Cobalt
3. Beryllium
4. Cadmium
5. Lead
6. Mercury
7. silver
8. gold
9. Carbon
10. Silicon
11. Steel
12. aluminum



COPPER

- copper is a chemical element; it has symbol **Cu** (from Latin *cuprum*) and atomic number 29. It is a soft, malleable, and ductile metal with very high thermal and electrical conductivity. A freshly exposed surface of pure copper has a pinkish-orange color. Copper is used as a conductor of heat and electricity, as a building material, and as a constituent of various metal alloys, such as sterling silver used in jewelry, cupronickel used to make marine hardware and coins, and constantan used in strain gauges and thermocouples for temperature measurement.

- Copper is essential to all living organisms as a trace dietary mineral because it is a key constituent of the respiratory enzyme complex cytochrome c oxidase.
  In molluscs and crustaceans, copper is a constituent of the blood pigment hemocyanin, replaced by the iron-complexed hemoglobin in fish and other vertebrates. In humans, copper is found mainly in the liver, muscle, and bone. The adult body contains between 1.4 and 2.1 mg of copper per kilogram of body weight.

COBALT

- cobalt is a chemical element; it has symbol **Co** and atomic number 27. As with nickel, cobalt is found in the Earth's crust only in a chemically combined form, save for small deposits found in alloys of natural meteoric iron. The free element, produced by reductive smelting, is a hard, lustrous, somewhat brittle, gray metal.

- Cobalt is primarily used in lithium-ion batteries, and in the manufacture of magnetic, wear-resistant and high-strength alloys. The compounds cobalt silicate and cobalt(II) aluminate ($CoAl_2O_4$, cobalt blue) give a distinctive deep blue color to glass, ceramics, inks, paints and varnishes. Cobalt occurs naturally as only one stable isotope, cobalt-59. Cobalt-60 is a commercially important radioisotope, used as a radioactive tracer and for the production of high-energy gamma rays. Cobalt is also used in the petroleum industry as a catalyst when refining crude oil. This is to purge it of sulfur, which is very polluting when burned and causes acid rain

BERYLLIUM

- **Beryllium** is a chemical element; it has symbol **Be** and atomic number 4. It is a steel-gray, hard, strong, lightweight and brittle alkaline earth metal. It is a divalent element that occurs naturally only in combination with other elements to form minerals. Gemstones high in beryllium include beryl (aquamarine, emerald, red beryl) and chrysoberyl. It is a relatively rare element in the universe.
- In structural applications, the combination of high flexural rigidity, thermal stability, thermal conductivity and low density (1.85 times that of water) make beryllium metal a desirable aerospace material for aircraft components, missiles, spacecraft and satellites. Because of its low density and atomic mass, beryllium is relatively transparent to X-rays and other forms of ionizing radiation; therefore, it is the most common window material for X-ray equipment and components of particle detectors

CADMIUM

- **Cadmium** is a chemical element; it has symbol **Cd** and atomic number 48. This soft, silvery-white metal is chemically similar to the two other stable metals in group 12, zinc and mercury. Like zinc, it demonstrates oxidation state +2 in most of its compounds, and like mercury, it has a lower melting point than the transition metals in groups 3
- cadmium occurs as a minor component in most zinc ores and is a byproduct of zinc production. It was used for a long time in the 1900s as a corrosion-resistant plating on steel, and cadmium compounds are used as red, orange, and yellow pigments, to color glass, and to stabilize plastic. Also use in making batteries

LEAD

- **Lead** is a chemical element; it has symbol **Pb** (from Latin *plumbum*) and atomic number 82. It is a heavy metal that is denser than most common materials. Lead is soft and malleable, and also has a relatively low melting point.
- These properties, combined with its relative abundance and low cost, resulted in its extensive use in construction, plumbing, batteries, bullets, shots, weights, solders, pewters, fusible alloys, lead paints, leaded gasoline, and radiation shielding.

MERCURY

- **Mercury** is a chemical element; it has symbol **Hg** and atomic number 80. It is also known as **quicksilver** and was formerly named **hydrargyrum**
- Mercury is used in thermometers, barometers, manometers, sphygmomanometers, float valves, mercury switches, mercury relays, fluorescent lamps and other devices, although concerns about the element's toxicity have led to the phasing out of such mercury-containing instruments. It remains in use in scientific research applications and in amalgam for dental restoration in some locales. It is also used in fluorescent lighting. Electricity passed through mercury vapor in a fluorescent lamp produces short-wave ultraviolet light, which then causes the phosphor in the tube to fluorescence, making visible light.

SILVER

- **Silver** is a chemical element; it has symbol **Ag** (from Latin *argentum* 'silver', derived from Proto-Indo-European *$*h_2erǵ$* 'shiny, white') and atomic number 47. A soft, white, lustrous transition metal, it exhibits the highest electrical conductivity, thermal conductivity, and reflectivity of any metal.
- It used in production of jewelry, electrical switches, cd photographic film and catalyst in oxidation

GOLD

- **Gold** is a chemical element; it has symbol **Au** (from Latin *aurum*) and atomic number 79. In its pure form, it is a bright, slightly orange-yellow, dense, soft, malleable, and ductile metal.
- The world's consumption of new gold produced is about 50% in jewelry, 40% in investments, and 10% in industry.[13] Gold's high malleability, ductility, resistance to corrosion and most other chemical reactions, as well as conductivity of electricity have led to its continued use in corrosion-resistant electrical connectors in all types of computerized devices (its chief industrial use). Gold is also used in infrared shielding, the production of colored glass, gold leafing, and tooth restoration. Certain gold salts are still used as anti-inflammatory agents in medicine.

CARBON

- **Carbon** (from Latin *carbo* 'coal') is a chemical element; it has symbol **C** and atomic number 6. It is nonmetallic and tetravalent—meaning that its atoms are able to form up to four covalent bonds due to its valence shell exhibiting 4 electrons. It belongs to group 14 of the periodic table.[16] Carbon makes up about 0.025 percent of Earth's crust.
- . For example, graphite is opaque and black, while diamond is highly transparent. Graphite is soft enough to form a streak on paper (hence its name, from the Greek verb "γράφειν" which means "to write"), while diamond is the hardest naturally occurring material known. Graphite is a good electrical conductor while diamond has a low electrical conductivity. Under normal conditions, diamond, carbon nanotubes, and graphene have the highest thermal conductivities of all known materials. All carbon allotropes are solids under normal conditions, with graphite being the most thermodynamically stable form at standard temperature and pressure. They are chemically resistant and require high temperature to react even with oxygen.

SILICON

- **Silicon** is a chemical element; it has symbol **Si** and atomic number 14. It is a hard, brittle crystalline solid with a blue-grey metallic luster, and is a tetravalent metalloid and semiconductor. It is a member of group 14.
- The small portion of very highly purified elemental silicon used in semiconductor electronics (<15%) is essential to the transistors and integrated circuit chips used in most modern technology such as smartphones and other computers. In 2019, 32.4% of the semiconductor market segment was for networks and communications devices, and the semiconductors industry is projected to reach $726.73 billion by 2027.

STEEL

Steel is an alloy of iron and carbon with improved strength and fracture resistance compared to other forms of iron. Because of its high tensile strength and low cost, steel is one of the most commonly manufactured materials in the world. Steel is used in buildings, as concrete reinforcing rods, in bridges, infrastructure, tools, ships, trains, cars, bicycles, machines, electrical appliances, furniture, and weapons.
Iron is always the main element in steel, but many other elements may be present or added. Stainless steels, which are resistant to corrosion and oxidation, typically need an additional 11% chromium.

Aluminium

- **Aluminium** (or **aluminum** in North American English) is a chemical element; it has symbol **Al** and atomic number 13. Aluminium has a density lower than that of other common metals, about one-third that of steel. It has a great affinity towards oxygen, forming a protective layer of oxide on the surface when exposed to air.
- Use along with silicon to produce solar panels and android phone chassis

What are the examples of E-waste

Common items in e-waste streams include computers, mobile phones, radio DVD/ CD players Iron boxes and large household appliances, as well as medical equipment

WHY E-WASTE

- **Electronic waste** (or **e-waste**) describes discarded electrical or electronic devices. It is also commonly known as **waste electrical and electronic equipment** (**WEEE**) or **end-of-life** (**EOL**) **electronics**. Used electronics which are destined for refurbishment, reuse, resale, salvage recycling through material recovery, or disposal are also considered e-waste. Informal processing of e-waste in developing countries can lead to adverse human health effects and environmental pollution.
- The growing consumption of electronic goods due to the Digital Revolution and innovations in science and technology, such as bitcoin, has led to a global e-waste problem and hazard. The rapid exponential increase of e-waste is due to frequent new model releases and unnecessary purchases of electrical and electronic equipment (EEE), short innovation cycles and low recycling rates, and a drop in the average life span of computers
- Electronic scrap components, such as CPUs, contain potentially harmful materials such as lead, cadmium, beryllium, or brominated flame retardants.

DANGERS OF E-WASTE

- As of 2013, Apple has sold over 796 million iDevices (iPod, iPhone, iPad). Cell phone companies make cell phones that are not made to last so that the consumer will purchase new phones. Companies give these products such short lifespans because they know that the consumer will want a new product and will buy it if they make it In the United States, an estimated 70% of heavy metals in landfills comes from discarded electronics.

Of all e-waste united state and like other western counterpart produces 100% and only 15% is recycled while the rest finds it way to south pacific and Africa, though globally 17.4% is recycled

1. Copper

- Ingesting too much or too little copper can lead to illness disease. Ingesting a high amount of copper, usually in drinking water, can cause vomiting, nausea, abdominal pain, and/or diarrhea.
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- Breathing in copper dusts, sprays, or crystals can irritate your nose and throat, and cause dizziness and headaches. People who have ingested these substances have gotten very sick and/or died.

2. Cobalt

- It can harm the eyes, skin, heart, and lungs. Exposure to cobalt may cause cancer. Workers may be harmed from exposure to cobalt and cobalt-containing products.

3. Berryllium

- Beryllium sensitization
- Chronic beryllium disease (CBD)
- Lung cancer
- Irreversible and sometimes fatal scarring of the lungs
- Increased risk for workers in industries where beryllium is present

4. Cadmium

Cadmium exerts toxic effects on the kidney, the skeletal system and the respiratory system and is classified as a **human carcinogen**. It is generally present in the environment at low levels; however, human activity has greatly increased levels in environmental media relevant to population exposure.

lead

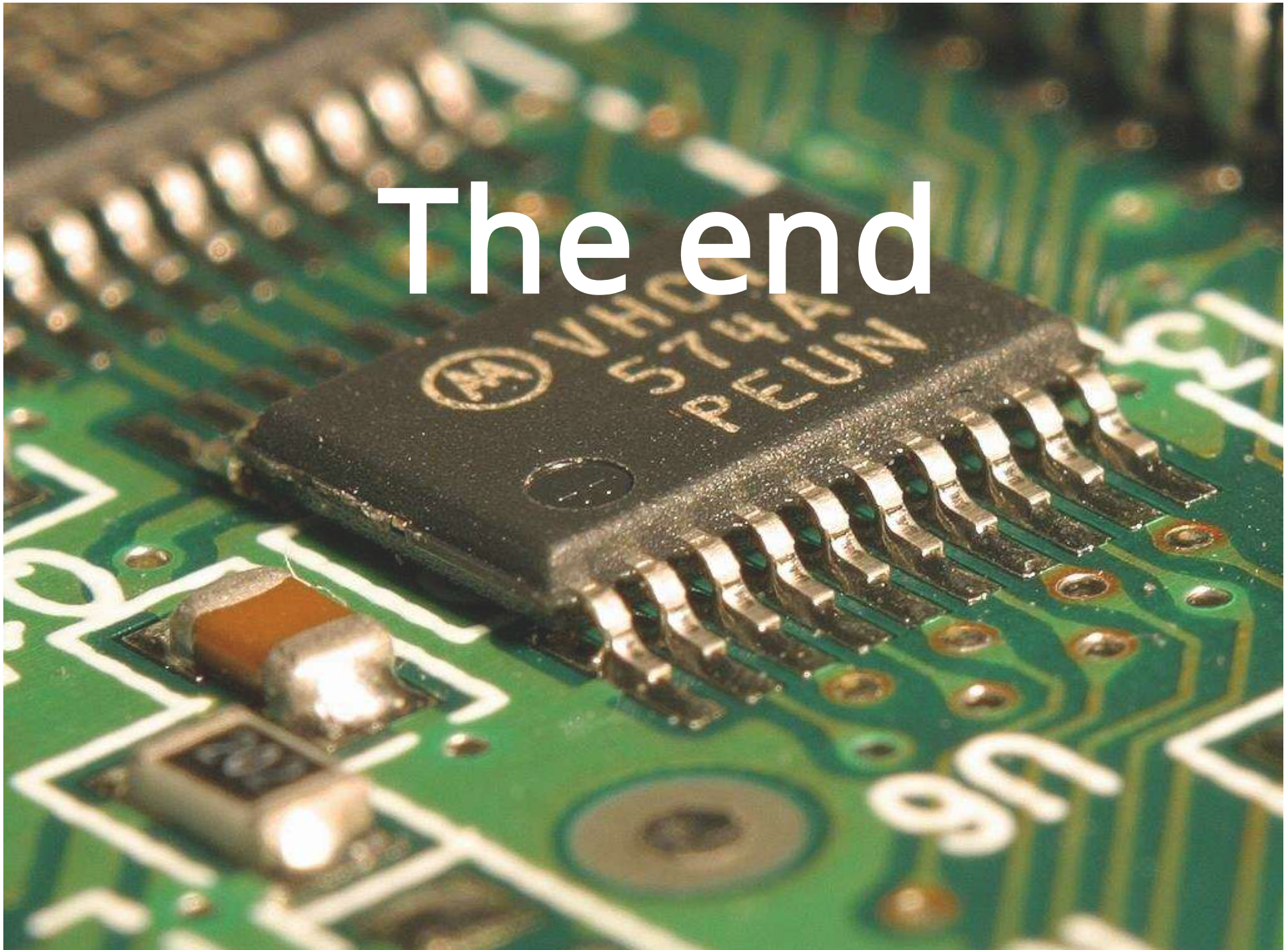
- Irreversible damage to brain development, particularly in children.
- Kidney damage.
- Increased risk of high blood pressure and cardiovascular problems.
- Reproductive problems in both men and women.

mercury

It can also be absorbed through the lungs and skin and result in hypersensitivity reactions. Ingestion of inorganic mercury compounds can cause severe, potentially fatal damage to the kidneys, gastrointestinal tract and other organ systems and even very low levels of exposure can impair the immune system

HOW TO REDUCE E-WASTE

1. Recycling of electronic parts such CPU, hard drive, monitors and so more
2. Right to repair most of electronics and electrical appliance are discarded to short of part or repairs
3. Making electronics and electrical appliances for long term usage
4. Government regulation on importation and e-waste management
5. Over the air update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