

Inorganic Arsenic

General information

Key Points

Fire

- Non flammable under normal conditions
- Emits toxic fumes when heated to decomposition
- Use fine water spray and liquid-tight chemical protective suits with breathing apparatus

Health

- Toxic by ingestion, inhalation and skin absorption
- Corrosive
- Short-term inhalation may cause cough, sore throat, breathlessness and wheezing
- Short-term ingestion causes sickness, diarrhoea and abdominal pain
- Inorganic arsenic is irritant to the eye and skin
- Following long-term ingestion the lungs, nervous system, liver, kidneys or stomach may be affected
- Long-term inhalation may cause inflammation of the eyes and nose
- Inorganic arsenic compounds have mutagenic potential
- Inorganic arsenic is a known human carcinogen

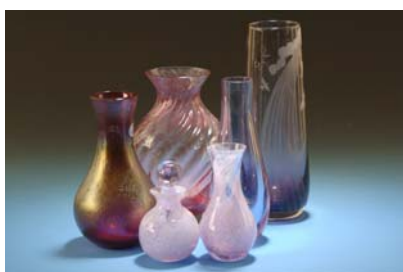
Environment

- Dangerous for the environment
- Inform Environment Agency of substantial release incidents

Background

Arsenic is a metal element that occurs naturally in the earth's crust and soils. It is usually combined with other elements such as oxygen or chlorine to form compounds including arsenic trioxide or arsenic trichloride. The type of arsenic compound is important when assessing the risk to health, as some forms are much less harmful than others.

Arsenic is used in a number of industries for making electronic components, special alloys and in the manufacture of certain glass and ceramic products.



Arsenic occurs naturally in the environment so we can be exposed by breathing air and from consuming contaminated food or water. Food is the biggest source of arsenic exposure for most people in the general population, with most arsenic in the UK diet coming from fish. The form of arsenic compound found in fish, called organic arsenic, is much less harmful than most forms used industrially which are mostly inorganic. There is no evidence that eating fish poses a health risk from arsenic.

Cigarette smoke contains arsenic and smoking can double your intake of arsenic each day.



Some areas of the world have naturally high levels of arsenic in water taken from wells

including in Hungary, Bangladesh, West Bengal in India and Taiwan. High levels of arsenic do not normally occur in the UK public drinking water supplies.



If exposed to arsenic, the harmful effects that may occur largely depend on the way people are exposed. Breathing air with high levels of arsenic can cause lung damage, shortness of breath, chest pain and cough, which may lead to death in severe cases. However, arsenic levels in the environment are usually not high enough to cause lung damage.

Eating food or drink contaminated with arsenic can cause stomach irritation, nausea, vomiting and diarrhoea. Large amounts can be poisonous and damage the stomach, kidneys, liver, heart and the nervous system and may cause death. Breathing or eating lower levels of air or food contaminated with arsenic over a long period of time can cause changes to the skin and damage to blood circulation.

Children exposed to arsenic will have the same symptoms of poisoning as adults. There is some evidence that exposure to high levels of arsenic can affect the unborn child. Small amounts of arsenic may also be found in breast milk.

Inorganic arsenic compounds are classified as carcinogens i.e. can cause cancer.

Production and Uses

Key Points

- Inorganic arsenic is produced primarily as a by-product from copper, lead and other metal smelting processes
- Uses for inorganic arsenic include glass and ceramics manufacture

Inorganic arsenic is produced primarily as a by-product from copper, lead and other metal smelting processes. Applications for inorganic arsenic include glass and ceramics manufacture. Up to 70% of global arsenic production is used in the industrial preservation of wood, as Chromated Copper Arsenate (CCA). Arsenic metal is used in electronic components (as gallium arsenide), and non-ferrous metal alloys.

Approximately 250 tons of arsenic metal were imported by the UK in 2003-2004.

Frequently Asked Questions

What is arsenic?

Arsenic is a metal that is widely distributed in the earth's crust (soil and rocks), air and water. Arsenic may be found as the metal or as a compound where it is combined with other elements, such as with oxygen to form arsenic trioxide.

What is arsenic used for?

Arsenic is used in a number of industries including the manufacture of glass and ceramics. Arsenic is also used in the industrial preservation of some wood products as well as certain specialist electronic components and alloys.

How does arsenic get into the environment?

Arsenic occurs naturally in rocks and erosion of these can cause arsenic to be released into water. Arsenic is also released into the air from human activities including smelting metals such as lead and copper. Arsenic may enter water and soil in waste from some industrial sites or waste disposal plants.

How could I be exposed to arsenic?

People are exposed to arsenic by eating foods such as fish and shellfish, and from drinking water. Cigarette smoke contains a large amount of arsenic, and smoking can double the amount taken in per day. Very low levels of arsenic are present in drinking water. Soil also may contain arsenic naturally or from contamination from some industrial processes.

If there is arsenic in the environment will I have any adverse health effects?

The presence of arsenic in the environment does not always lead to exposure. Clearly, in order for it to cause any adverse health effects you must come into contact with it. You may be exposed by breathing, eating, or drinking the substance or by skin contact. Following exposure to any chemical, the adverse health effects you may encounter depend on several factors, including the amount to which you are exposed (dose), the way you are exposed, the duration of exposure, the form of the chemical and if you were exposed to any other chemicals.

Arsenic compounds may be corrosive and cause burns to the skin or eyes on contact. Eating food or drink contaminated with high levels of arsenic can irritate the stomach, causing pain, vomiting and diarrhoea. Large amounts can damage the stomach, heart and nervous system and may cause death. Breathing high levels of arsenic dusts or vapours can damage the lungs, which may lead to death in severe cases.

Long term exposures in regions of the world with high levels of arsenic can cause skin changes, may affect blood circulation, the liver and kidneys and nervous system.

Can arsenic cause cancer?

The International Agency for Research on Cancer classified arsenic and its compounds as being carcinogenic in humans. Prolonged exposure to arsenic may produce lung, skin and bladder cancers. Because of this arsenic levels are under stringent control and exposures to arsenic in water, air and food are reduced to the lowest practical level to minimise possible risks to health. Short term exposure to arsenic is likely to be associated at most with only a very small increase in the risk of cancer.

Does arsenic affect children or damage the unborn child?

If children breathe or ingest arsenic they may have similar effects as in adults i.e. stomach irritation and at high levels may have stomach, heart and nervous system damage.

There is some evidence, though not conclusive, that maternal inhalation exposure to arsenic may affect the unborn child. In several animal tests, high levels of arsenic caused an increased number of animals born with malformations or fewer animals born.

What should I do if I am exposed to arsenic?

It is very unlikely that the general population will be exposed to a level of arsenic high enough to cause adverse health effects.

This document will be reviewed not later than 3 years or sooner if substantive evidence becomes available.