

VANADIUM



The potable water coming from the pick of Mount Etna is high in potentially dangerous metals like iron, boron, manganese, radon and Vanadium. Their levels usually (in the water, but even in the air) pass the tolerable concentration. Scientists discovered mainly high quantities of Vanadium, such as in Bronte's potable water and that is another cause of the huge number of thyroid cancer in this area.



BUT WHAT IS VANADIUM?

<p><u>Description</u></p>	<p>Vanadium is a naturally occurring element. It is widely distributed in the earth's crust with a concentration of approximately 100 mg/kg. It's found in about 65 different minerals.</p> <p>Depending on its form, vanadium can be a silvery grey metal or white lustrous powder.</p> <p>Pure vanadium is a bright white, soft, and ductile metal.</p>
<p><u>Uses:</u></p> <p><u>Vanadium metal</u></p>	<p>Vanadium is used in producing rust-resistant, spring, and high-speed tool steels.</p> <p>It is an important carbide stabilizer in making steels.</p>
<p><u>Vanadium pentoxide</u></p>	<p>Vanadium pentoxide is used in ceramics and the production of superconductive magnets.</p>
<p><u>Vanadyl sulfate and sodium metavanadate</u></p>	<p>Vanadyl sulfate and sodium metavanadate have been used in dietary supplements.</p>

WHAT HAPPENS TO VANADIUM WHEN IT ENTERS THE ENVIRONMENT?

<p><u>Sources</u></p>	<p>Vanadium occurs naturally in soil, water, and air.</p> <p>Natural sources of atmospheric vanadium include continental dust, marine aerosol, and volcanic emissions.</p> <p>Releases of vanadium to the environment are mainly associated with industrial sources, especially oil refineries and power plants using vanadium rich fuel oil and coal.</p> <p>Global human-made atmospheric releases of vanadium have been estimated to be greater than vanadium releases due to natural sources.</p> <p>Natural releases to water and soil are far greater overall than human-made releases to the atmosphere.</p>
<p><u>Break down air</u></p>	<p>Vanadium cannot be destroyed in the environment. It can only change its form or become attached or separated from airborne particulate, soil, particulate in water, and sediment.</p> <p>Vanadium particles in the air settle to the ground or are washed out of the air by rain. Smaller particles, such as those emitted from oil-fueled power plants, may stay</p>

	more likely to be transported farther away from the site of release.
<u>water</u> <u>and</u> <u>soil</u>	The transport and partitioning of vanadium in water and soil is influenced by many factors including acidity of the water or soil and the presence of particulates. Vanadium can either be dissolved in water as ions or may become adsorbed to particulate matter.

HOW MIGHT I BE EXPOSED TO VANADIUM?



<u>Food-primary</u> <u>source of</u>	<p>Most foods have naturally occurring low concentrations. Fish, particularly shellfish, contains higher concentrations of vanadium than meat.</p> <p>Daily intakes of vanadium from food ranging from 0.001 to 0.005 mg. Average vanadium concentrations in tap water are approximately 0.001 mg/L. Average daily intake of approximately 0.002 mg of vanadium from tap water for adults.</p>
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<p><u>exposure</u></p>	<p>Vanadium also may be found in various commercial nutritional supplements</p> <p>Consumption of some vanadium-containing supplements may result in intakes of vanadium that would exceed intakes from food and water.</p> <p>Populations in areas with high levels of residual fuel oil consumption may also be exposed to above-background levels of vanadium, from increased crops and soil in the vicinity of power plants.</p>
<p><u>Air</u></p>	<p>Most people take in very little vanadium from breathing. The general population may also be exposed to airborne vanadium through inhalation, particularly in areas where a large number of oil fired power plants are using residual fuel oils for energy production.</p> <p>Individuals exposed to cigarette smoke may also be exposed to higher than background levels of vanadium. Approximately 0.0004 mg of vanadium cigarette.</p>
<p><u>Water and soil</u></p>	<p>vanadium concentrations in surface water can range depending on geographical location.</p>

HOW CAN VANADIUM ENTER AND LEAVE MY BODY?

<u>inhalation</u>	Some of the vanadium you breathe will enter your body through your lungs; however, we do not know how much will enter.
<u>ingestion</u>	A small amount of vanadium in food and water (3-20%) digestive tract.
<u>dermal contact</u>	We do not know how much vanadium will enter your body through your skin. It is likely that very little will pass through the skin.

HOW CAN VANADIUM AFFECT MY HEALTH?

<u>Workers</u> • <u>Inhalation</u>	<u>Breathing air with vanadium pentoxide can result in a number of days after exposure.</u>
<u>Humans</u> • <u>Oral</u>	Nausea, mild diarrhea, and stomach cramps have been reported in people given metavanadate or vanadyl sulfate for the experimental treatment of cancer. Stomach cramps were also reported in a study of people given 10 mg vanadium/day.
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• <u>Cancer</u>	Lung cancer has been found in mice exposed to vanadium pentoxide.

The International Agency for Research on Cancer (IARC) has classified vanadium pentoxide as possibly carcinogenic to humans. It could cause mainly



HOW CAN VANADIUM AFFECT CHILDREN?

These are potential health effects in humans from exposures during the period from conception to maturity at 18 years of age.

<i>Effects in children</i>	The health effects seen in children from exposure to vanadium are expected to be similar to the effects seen in adults.
<i>Birth defects</i>	Studies in animals exposed during pregnancy have shown decreases in growth and increases in the occurrence of birth defects usually observed at levels which cause effects in the offspring. These effects were observed at vanadium doses which did not cause effects in the parents.

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- **HOW CAN FAMILIES REDUCE THE RISK OF EXPOSURE TO VANADIUM?**

<p>F o o d</p>	<p>Vanadium is a naturally occurring element that is widely distributed. It is found in many foods, typically in small amounts. You cannot avoid exposure to vanadium.</p> <p>Exposure to the levels of vanadium that are naturally present in food and water are not considered to be harmful.</p>
<p>C o ns u m er pr o d u ct s</p>	<p>Consumption of some vanadium-containing supplements may result in intakes that would exceed intakes from food and water.</p> <p>You should check with your physician before taking supplements containing vanadium to determine if such supplements are appropriate for you.</p> <p>As a precaution, such products should have child-proof caps or should be kept out of reach of children so that children will not accidentally ingest them.</p>
<p>Ai r</p>	<p>Individuals exposed to cigarette smoke may also be exposed to higher-than-background levels of vanadium.</p> <p>Avoiding exposure to cigarette smoke may reduce exposure of you and your family to vanadium.</p> <p>To limit exposure to vanadium particles in the air, use a wet mop on non-carpeted floors, use a wet rag</p>

	<p>instead of a dry rag or duster to dust, vacuum your carpet often using a vacuum with a high-efficiency and keep windows and doors closed on windy days</p>
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• IS THERE A MEDICAL TEST TO DETERMINE WHETHER I HAVE BEEN EXPOSED TO VANADIUM?

<p><u>• Detecting exposure</u></p>	<p>All people have small amounts of vanadium in their bodies. It can be measured in blood, urine, and hair. Measurement of vanadium levels require special methods and equipment, which can be found in a specialized clinical laboratory.</p>
<p><u>• Measuring exposure</u></p>	<p>Measurements of vanadium concentrations in blood and urine can tell you whether you have been exposed to larger-than-normal amounts of vanadium. Blood and urinary vanadium levels are considered the most reliable indicators of occupational exposure to vanadium. Measuring vanadium levels in hair is not a good indicator of occupational or environmental exposure to vanadium.</p>

• WHAT RECOMMENDATIONS HAS THE FEDERAL GOVERNMENT MADE TO PROTECT HUMAN HEALTH?

- The federal government develops regulations and recommendations to protect public health. Regulations *can* be enforced by law. Regulations and recommendations can be expressed as "not-to-exceed" levels. These are levels of a toxic substance in air, water, soil, or food that do not exceed a critical value. This critical value is usually based on levels that affect animals; they are then adjusted to levels that will help protect humans. Sometimes these not-to-exceed levels differ among federal organizations because they used different exposure times (an 8-hour workday or a 24-hour day), different animal studies, or other factors.

Some regulations and recommendations for vanadium include the following:

<i>Workplace air</i>	OSHA set a legal limit of 0.5 mg/m ³ for vanadium pentoxide respirable dust as a ceiling not to be exceeded. A ceiling limit of 0.1 mg/m ³ for vanadium pentoxide fume has also been established.
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