Tellurium

This sample of tellurium is displayed in the Smithsonian Museum of Natural History. The sample is about 6x4 cm and is from the De La Mar mine, Delamar, Nevada. (Source:Georgia State University)

Tellurium is a metallic, silvery-white element. Some even describe its appearance as "very metallic." Its atomic number is 52 and its symbol is Te. It was discovered in 1783 by Baron Franz Joseph Muller von Reichenstein of Romania, the chief inspector of mines in Transylvania at the time. Tellurium is very brittle and easily pulverized. It does not react with air or water.
As a commodity, tellurium is used in industry as pure tellurium metal, tellurium dioxide (TeO_2), and alloyed (that is, mixed) with other metals.
Tellurium has no known benefit to humans. It does have a strange effect on humans, though. When tellurium is ingested, even in very small amounts, it causes very bad, garlic-smelling breath and body odor.

There are a very small number of tellurium minerals. It combines with oxygen to form tellurite, and withgold and silver to form sylvanite $(Au,Ag)Te_2$. The most common gold telluride mineral is called calaverite ($AuTe_2$).

Name

Previous Element: Antimony **Next Element: Iodine**	52 **Te** 127.6
Physical Properties	
Color	Silvery
Phase at Room Temp.	solid
Density (g/cm^3)	6.25
Hardness (Mohs)	2.3
Melting Point (K)	722.7
Boiling Point (K)	1263
Heat of Fusion (kJ/mol)	13.5
Heat of Vaporization (kJ/mol)	---
Heat of Atomization (kJ/mol)	197
Thermal Conductivity (J/m sec K)	11.54
Electrical Conductivity (1/mohm cm)	0
Source	Zn/Pb smelting by-product
Atomic Properties	

Electron Configuration	[Kr]$4d^{10}5s^{2}5p^{4}$
Number of Isotopes	8
Electron Affinity (kJ/mol)	190.16
First Ionization Energy (kJ/mol)	869.2
Second Ionization Energy (kJ/mol)	1794.6
Third Ionization Energy (kJ/mol)	2697.7
Electronegativity	2.1
Polarizability ($Å^3$)	5.5
Atomic Weight	127.6
Atomic Volume (cm^3/mol)	20.4
Ionic Radius^{2-} (pm)	207
Ionic Radius^{1-} (pm)	---
Atomic Radius (pm)	142
Ionic Radius^{1+} (pm)	---
Ionic Radius^{2+} (pm)	---
Ionic Radius^{3+} (pm)	---
Common Oxidation Numbers	-2,+2,+4,+6
Other Oxid. Numbers	+5
Abundance	
In Earth's Crust (mg/kg)	1×10^{-3}
In Earth's Ocean (mg/L)	No data available
In Human Body (%)	near 0%
Regulatory / Health	
CAS Number	13494-80-9
OSHA Permissible Exposure Limit (PEL)	TWA: 0.1 mg/m^3
OSHA PEL Vacated 1989	TWA: 0.1 mg/m^3
NIOSH Recommended Exposure Limit (REL)	TWA: 0.1 mg/m^3 IDLH: 25 mg/m^3
Sources: University of Wisconsin General Chemistry Mineral Information Institute Jefferson Accelerator Laboratory EnvironmentalChemistry.com	

The name *tellurium* came from the Latin word *tellus*meaning *earth*.

Sources

Tellurium is recovered from the residue produced in refining blister copper from deposits containing recoverable amounts of tellurium. There are large quantities of tellurium in some gold and lead deposits, but the tellurium is not being recovered from these at this time. In addition, tellurium is present in coal and some lower-grade copper deposits, but the cost of recovering the tellurium from these deposits is too high to make it worth the effort. These deposits are called*subeconomic deposits*.

Nations producing tellurium and tellurium dioxide are the United States, Canada, Japan, Peru, and a number of other countries. As with most commodities, companies in the United States import tellurium. Of the tellurium imported each year, most comes from the United Kingdom, followed by Philippines, Belgium, Canada, and a number of other nations.

Uses

Half of the tellurium consumed each year is used to improve the machinability of special iron and steel products. It is alloyed with copper to make copper more ductile (that is, easier to stretch into wires), and with lead to prevent corrosion. These, and other nonferrous tellurium alloys, account for approximately 10% of tellurium use. Tellurium is also used to make catalysts and chemicals. Some of these chemicals are used in the petroleum industry and in making rubber. Tellurium is added to selenium-based photoreceptors to broaden the spectral range of copiers. Tellurium is also used in other electronic applications, and in the production of blasting caps for explosives.

Substitutes and Alternative Sources

Selenium, bismuth and leadcan be used in place of tellurium in many of its metallurgical uses. Selenium and sulfur can be used in place of tellurium in the production of rubber.

Source: http://www.eoearth.org/view/article/156462/