"Tellurium Toxicity"

--The true nature of the "poisonous substances" that were hidden even though they were released

during the Fukushima Daiichi nuclear power plant accident--

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Chapter 1 What is tellurium?

Tellurium is a "metal"

Tellurium is a type of metal and is classified as a "metal that does not concentrate." It is an element with atomic number 52, and its chemical formula is "Te". As a gas, tellurium is golden yellow, and as a metal, tellurium is silvery gray. Typical tellurium compounds include carbon dioxide, which is a colorless crystal. These include tellurium (TeOÿ) and sodium tellurate (NaÿOÿTe), which is also a colorless crystal.

The main use of tellurium, which is also a rare metal, is to improve the machinability of steel. additives for special steel, copper telluride, catalysts, vulcanization accelerators for synthetic rubber, glass and ceramics. Adhesives for porcelain, red and yellow coloring agents for ceramics and enameled glass, selenium alloys for photoreceptors, cadmium telluride and bismuth telluride for solar cells, and materials for semiconductors. Lead luride etc.

Tellurium is toxic

Tellurium is also a toxic substance that is dangerous to humans. Symptoms of toxicity at 0.25mg and reaches a lethal dose at 2g.

Exposure to tellurium causes your breath and sweat to have a foul odor similar to garlic. dry mouth or feel a metallic taste. You may also feel drowsy, lose your appetite, or feel nauseous. Sweating may stop or dermatitis may occur. The toxicity of tellurium compounds varies depending on their chemical structure. The half-lethal dose of tellurium compounds in animal experiments is that of dimethyl telluride (CÿHÿTe). When ingested by rats, the toxicity was 7.5 mg/kg, which is comparable to 10 mg/kg of potassium cyanide.

In addition, the oral half-lethal dose of tellurium and telluric acid (HÿOÿTe, Te(OH)ÿ) is The toxicity is comparable to that of arsenite, with 83 mg/kg of telluric acid and 56 mg/kg of telluric acid.

Classified into "stable tellurium" and "radioactive tellurium"

Tellurium is divided into "stable tellurium" and "radioactive tellurium" which is a radioactive substance (radioactive isotope).

It is classified as

Tellurium is one of the most toxic elements, and "stable tellurium" and its radioactive isotope are

Both radioactive tellurium and radioactive tellurium were used at the TEPCO Fukushima Daiichi plant in 2011.

It was released into the environment during a nuclear power plant (nuclear power plant) accident.

Large amounts of tellurium were leaked from the Fukushima Daiichi nuclear power plant accident.

The nuclear fuel installed in the reactors of nuclear power plants contains both ``stable tellurium'' and its radioactive isotope, ``radioactive tellurium.'' The amount of ``stable tellurium'' is said to be 1,000 to 10,000 times greater than that of ``radioactive tellurium.''

		半減期	1号機 炉心部の放射能（Bq）	1号機 炉心部の質量（g）	2号機 炉心部の放射能（Bq）	2号機 炉心部の質量（g）	3号機 炉心部の放射能（Bq）	3号機 炉心部の質量（g）	Bq当たりの質量(g/Bq)	毒性の分類
テルル	Te-127	9.35時間	6.99E+16	0.7	1.16E+17	1.2	1.20E+17	1.23	1.02E-17	化学毒＋放射能毒
	Te-127m	109日	8.22E+15	2.4	1.23E+16	3.5	1.34E+16	3.83	2.86E-16	化学毒＋放射能毒
	Te-128（安定テルル）	7.7×10^{24}年	0	7070	0	6160	0	5810	0	化学毒
	Te-129	69.6秒	2.66E+16	0.03	4.28E+16	0.1	4.53E+16	0.584	1.29E-18	化学毒＋放射能毒
	Te-129m	33.6日	4.15E+16	37.3	6.95E+16	62.4	7.07E+16	63.5	8.98E-16	化学毒＋放射能毒
	Te-130（安定テルル）	2.7×10^{21}年	0	19840	0	24100	0	22700	0	化学毒
	Te-131	25分	1.34E+16	0.01	2.26E+16	0.01	2.31E+16	0.0109	4.72E-19	化学毒＋放射能毒
	Te-131m	30日	5.94E+16	2.0	1.01E+17	3.4	1.03E+17	3.49	3.39E-17	化学毒＋放射能毒
	Te-132	3.2日	1.02E+18	90.8	1.76E+18	157	1.76E+18	157	8.90E-17	化学毒＋放射能毒
放射性ヨウ素	I-131	8.02日	1.08E+18	236	1.87E+18	408	1.86E+18	406	2.18E-16	放射能毒
	I-132	2.3時間	1.05E+18	2.8	1.81E+18	4.7	1.81E+18	4.74	2.62E-18	放射能毒
	I-133	20.8時間	2.65E+17	6.3	4.58E+17	10.9	4.57E+17	10.9	2.38E-17	放射能毒
放射性セシウム	Cs-134	2.065年	1.90E+17	3970	2.76E+17	5770	2.51E+17	5250	2.09E-14	放射能毒
	Cs-137	30.17年	2.02E+17	62700	2.55E+17	79100	2.41E+17	74700	3.10E-13	放射能毒

Tellurium (stable tellurium, radioactive tellurium), radioactive iodine, and radioactive cesium that had been deposited in the cores of Units 1, 2, and 3 of the Fukushima Daiichi Nuclear Power Plant before the accident. Source: JAEA-Data/Code 2012-18 "Fukushima Excerpt from "Fuel Composition Evaluation of Daiichi Nuclear Power Plant". For the calculation of mass, see the above paper URL: http://doi.org/10.11484/jaea-data-code-2012-018 .

Calculations were made based on the "Fuel Composition Evaluation of the Fukushima Daiichi Nuclear Power Plant" by JAEA (Japan Atomic Energy Agency), and the Fukushima Daiichi Nuclear Power Plant The nuclear fuel loaded in Units 1, 2, and 3 contained ``stable tellurium.''

It is estimated that a total of 85.1 tons (8.51 g x 10 to the 4th power = 85,100 kg) of "radioactive tellurium" (Te-125, Te-128, Te-130) were included.

A large amount of it leaked into the environment due to the Fukushima Daiichi nuclear power plant accident. I did it. As of 2021, 10 years after the nuclear power plant accident, the exact amount of leakage has not been made public by the government or TEPCO.

The radioactivity of "stable tellurium" is virtually zero. Therefore, even if measured with a dosimeter, the It is not possible to determine the presence or amount of tellurium. However, even though it is clear that a large amount of this toxic material has accumulated inside the nuclear reactor and that it leaked into the environment in a major accident, the Japanese government and the Tokyo Electricity is

The existence of Lulu and the true identity of Tellurium are hidden from the general public, including Fukushima residents. I've been doing it.

On the other hand, even with "radioactive tellurium", Te-127m (half-life 109 days) and Te-129m (half-life 109 days) Many of them have short half-lives, such as 33.6 days), Te-131m (30 days), and Te-132 (3.2 days), so they are difficult to measure and have not been considered important as pollutants.

The toxic and dangerous substance leaked from the Fukushima Daiichi nuclear power plant accident is actually "radioactive cesium" It wasn't just radioactive iodine.

For your information, even in the multi-nuclide removal equipment called ALPS, which purifies contaminated water and whose name is often heard during the work to resolve the Fukushima Daiichi accident, tellurium, a toxic substance, is removed. Captured. Below is a table of "Tellurium removal results" compiled by TEPCO.

【参考】二次処理性能確認試験結果詳細(J1-C群)

	核種（半減期）	告示濃度限度【ﾍﾞｸﾚﾙ/ﾘｯﾄﾙ】	二次処理前		二次処理後		備考
			分析結果【ﾍﾞｸﾚﾙ/ﾘｯﾄﾙ】	告示濃度比※1	分析結果【ﾍﾞｸﾚﾙ/ﾘｯﾄﾙ】	告示濃度比※1	
14	ｶﾄﾞﾐｳﾑ115m（約45日）	300	ND (22.6)	0.075	ND (2.70)	0.0090	
15	ｽｽﾞ119m（約290日）	2,000	ND (390)	0.19	ND (42.4)	0.021	ｽｽﾞ123の放射能濃度より評価
16	ｽｽﾞ123（約130日）	400	ND (60.6)	0.15	ND (6.59)	0.016	
17	ｽｽﾞ126（約100000年）	200	ND (2.88)	0.014	ND (0.292)	0.0015	
18	ｱﾝﾁﾓﾝ124（約60日）	300	ND (0.279)	0.00093	ND (0.0967)	0.00032	
19	ｱﾝﾁﾓﾝ125（約3年）	800	83.0	0.10	0.226	0.00028	
20	ﾃﾙﾙ123m（約120日）	600	ND (0.832)	0.0014	ND (0.0919)	0.00015	
21	ﾃﾙﾙ125m（約58日）	900	83.0	0.092	0.226	0.00025	ｱﾝﾁﾓﾝ125と放射平衡
22	ﾃﾙﾙ127（約9時間）	5,000	ND (72.5)	0.015	ND (4.69)	0.00094	
23	ﾃﾙﾙ127m（約110日）	300	ND (75.3)	0.25	ND (4.87)	0.016	ﾃﾙﾙ127の放射能濃度より評価
24	ﾃﾙﾙ129（約70分）	10,000	ND (12.7)	0.0013	ND (0.615)	0.000061	
25	ﾃﾙﾙ129m（約34日）	300	ND (13.1)	0.044	ND (1.37)	0.0046	
26	ヨウ素129（約16000000年）	9	29.9	3.3	1.16	0.13	

※1　有効数字2桁　7

Quoted from TEPCO's "Fukushima Daiichi Nuclear Power Plant Secondary treatment performance confirmation test results for water treated by multi-nuclide removal
equipment (final report)". https://www.tepco.co.jp/decommission/information/newsrelease/reference/pdf/2020/2h/rf_20201224_1.pdf

More "stable tellurium" than "radioactive tellurium" leaked out.

As mentioned above, the tellurium in the reactor was more ``stable tellurium'' than ``radioactive tellurium.'' Therefore, tellurium leaked into the environment is also ``stable tellurium.'' It would be natural to think that there were many.

However, since the nuclear power plant accident occurred, contamination by "radioactive tellurium" has been measured and some understanding has been gained, although it is incomplete, but the actual state of contamination by "stable tellurium" is unknown. is not properly understood.

Both "stable tellurium" and "radioactive tellurium" are extremely dangerous if left in the natural environment. There is no change in the fact that it is a highly toxic substance.

Furthermore, "stable tellurium" does not decay like "radioactive tellurium", so it is a toxic substance.

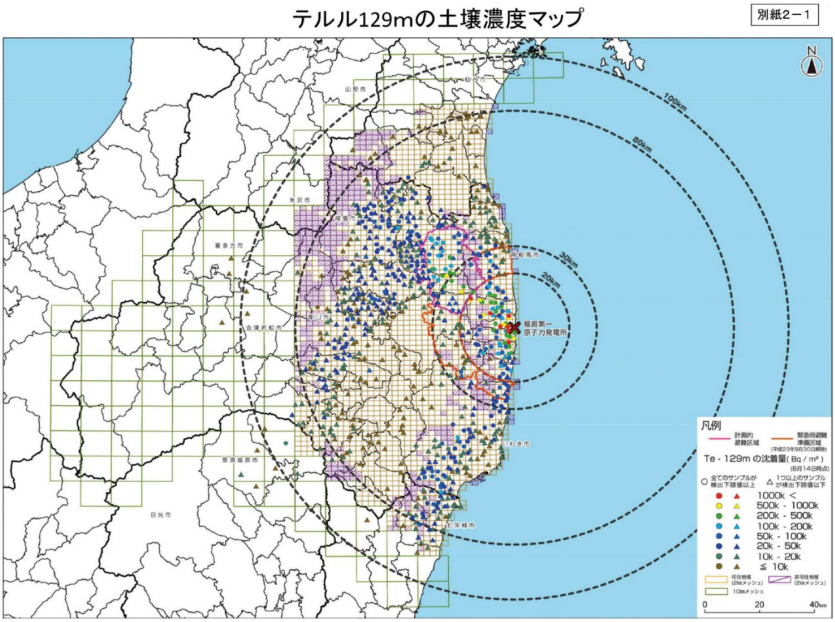
They continue to exist in these areas and continue to threaten the health of the people living there.

What is the estimated amount released into the environment due to the Fukushima Daiichi nuclear power plant accident?

There is a soil contamination map for "radioactive tellurium" prepared by the Ministry of Education, Culture, Sports, Science and Technology.

vinegar. However, there are no soil contamination maps for "stable tellurium."

Below is a contamination map (as of June 14, 2011) of "Te-129m" (half-life 33.6 days) created by the Ministry of Education, Culture, Sports, Science and Technology. "Stable tellurium" is 1,000 to 10,000 times larger than this. You can think about it.



Quoted from the Ministry of Education, Culture, Sports, Science and Technology's creation of radiation dose distribution maps (soil concentration maps for tellurium 129 m and silver 110 m) (October 31, 2011). Current as of June 14, 2011. https://radioactivity.nsr.go.jp/ja/contents/6000/5050/24/5600_111031_rev130701.pdf

Chapter 3 Symptoms caused by tellurium

We will introduce a number of acute symptoms when poisoned with tellurium. In the case of a small amount of poisoning, radioactive substances cause insensitivity, but even a small amount of poisoning with tellurium causes the following acute symptoms. There are sexual ``subjective symptoms.'' Many of these symptoms improve when you move away from tellurium poisoning.

Numerous acute symptoms

ÿ Sensing with taste

Inhaling tellurium aerosols or ingesting tellurium-contaminated substances can cause It tastes like when you lick the genus. Your mouth may become dry.

ÿDetect tellurium with your sense of smell

Inhalation of tellurium aerosols or ingestion of tellurium-contaminated substances can cause respiratory irritation. Breath and sweat have a foul odor similar to garlic. This is called "tellurium exhalation." You may also smell blood.

ÿ Visually sense

When tellurium (Te) oxidizes to tellurium dioxide (TeO2), it generates heat and emits blue light. To do.

ÿ Sensing with the sense of temperature

If you are surrounded by a plume containing tellurium (air with high pollution concentration), you will feel lukewarm. I feel it.

ÿ Sensing through touch and pain

Exposure to tellurium aerosols (fine particles floating in the air) can cause sudden sunburn.

You may feel an irritating pain to your skin, as well as irritation to your eyes, nose, and throat. I felt a headache

This may cause sweating, stop sweating, or cause dermatitis.

Hair loss may also occur about two weeks after taking the drug.

ÿ If you inhale tellurium

aerosols detected by your physical condition or ingest tellurium-contaminated substances, you may feel sick,

nausea, or vomiting. sleepiness

You may also feel a loss of appetite.

The acute toxicity symptoms of tellurium are similar to those caused by exposure to an atomic bomb (atomic bomb).

There are some overlaps in the symptoms. Among the symptoms seen after exposure to atomic bombs, tellurium poisoning

However, some of the symptoms that may be seen include:

•Gastrointestinal symptoms: nausea, vomiting, loss of appetite, diarrhea, constipation

•Nervous symptoms---heavy head, headache, delirium, dizziness •Mental symptoms---illusions

•Symptoms such as fatigue---

feeling of weakness, malaise

•Blood symptoms: blood in the urine, nosebleeds, bleeding from the gums, melena, bleeding from the genitals, overflow.

Blood spots (internal bleeding under the skin), decreased white blood cells, anemia

•Symptoms such as inflammation - fever, pharyngitis, stomatitis

Other symptoms include menstrual abnormalities and hair loss.

A number of chronic symptoms

Chronic symptoms caused by tellurium include:

ÿ Teratogenicity

Animal experiments using rabbits and rats exposed tellurium for long periods of time.
In some cases, teratogenicity has been confirmed, causing abnormalities in fetal organs, hydrocephalus, and malformations of the tail and legs.

ÿ Disorders to the thyroid gland

Animal experiments using rats have shown that tellurium accumulates in the thyroid gland and
It has been confirmed that it reduces accumulated stable iodine.

ÿ Neurotoxicity

In animal experiments using rats, it has been confirmed that a neurological disease called ``myelin demyelination'' occurs, in which nerve signals are not transmitted properly. This can lead to movement disorders such as paralysis of the limbs, joint pain, and chronic fatigue.

ÿToxicity to blood

In animal experiments using rats, it has been confirmed that hemolysis accompanied by a decrease in the number of red blood cells and hemoglobin concentration in the blood, and an increase in the concentration of birubirin in the urine.

ÿ Reproductive toxicity

In animal experiments using rats, fetuses were found to exhibit hydrocephalus, edema, proptosis, eye hemorrhage, umbilical hernia (so-called protrusion), undescended testes, decreased kidney size, and low birth weight. Confirmed. Bleeding during early pregnancy, abnormal delivery, premature birth, stillbirth, and maternal weight loss have been confirmed in mother rats.

Regarding carcinogenicity, animal experiments using rats showed no significant increase in incidence. It is said that it was not possible. There is also insufficient knowledge regarding carcinogenicity to humans. Not included.

Why has “tellurium” been overlooked?

As mentioned above, it was not only radioactive cesium and radioactive iodine that were released into the environment during the Fukushima Daiichi nuclear power plant accident. Toxic substances consisting of various radioactive substances and chemicals were scattered. This fact is overlooked
What is the cause of this?

Politicians, scientists, and power company officials who want to downplay the Fukushima Daiichi nuclear disaster They say this in unison:

``Although the Fukushima Daiichi Nuclear Accident has been rated as ``Level 7,'' the amount of radioactive materials that leaked into the environment is considerably higher than the Chernobyl Nuclear Accident, which is also rated as ``Level 7.'' ``This level of
radioactive contamination is not expected to pose a health hazard to residents.''

stomach"

It is true that the various subjective symptoms complained of by residents who were exposed to the radioactive gases and substances that leaked into the environment during the Fukushima Daiichi nuclear power plant accident cannot be adequately explained by ``exposure'' alone.
There were many things I couldn't find. People who want to underestimate accidents
I have come.

However, I remembered many of the ``acute symptoms caused by tellurium poisoning'' that were covered in this book. please do it. ``Nosebleeds'', ``diarrhea'' and ``fatigue'', which have been dismissed as ``damaging rumors'', are the same acute symptoms of tellurium.

Based on the acute and chronic symptoms of tellurium that we have introduced in this book, we have
Re-examining the numerous symptoms that innocent residents have complained about since the accident occurred.

I have to.

In addition to "stable tellurium" and "radioactive tellurium" that have been explained in this book, there are other

I'm sure there are some toxic substances that are being disposed of. To find out, here is

We have no choice but to continue our steady investigation.

The Fukushima Daiichi Nuclear Power Plant accident was also a ``pollution incident'' caused by toxic substances

leaking from a broken nuclear power plant. The nuclear power plant accident is not over yet.

List of references

Ministry of the Environment “Tellurium and its compounds”, https://www.env.go.jp/chemi/report/h29-01/pdf/chpt1/1-2-2-11.pdf

JAEA-Data/Code 2012-018 “Fuel composition evaluation of Fukushima Daiichi Nuclear Power Plant”

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true identity of the "poisonous substance" that was hidden even though it was released during the Fukushima Daiichi nuclear power plant accident -

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