1 Tellurium

Tellurium (atomic weight 127.6, atomic number 52) in an extremely rare semi-metallic and weakly toxic element. The closest chemically similar elements are sulfur and selenium. Due to ionic incompatibility, substitution in sulfide and selenide minerals does not typically occur. Tellurium can naturally occur in elemental form as a brittle silvery-white metal but it is more commonly found as telluride and co-associated with gold, silver and platinum. Crustal abudance is estimated to be 3 ppb, making it 8 times less abundant than gold [1] and comparable in abundance to platinum.

1.1 Uses

Commercially Cadmium Telluride is used in photoelectric devices, solar cells and in steel alloys. It is also used in thermoelectric devices for cooling and energy generation. [3]It also has some military applications especially for night vision [6].

1.2 Deposits

Copper porphyry deposits contain Tellurium in trace amounts and is recovered from anode sludges in electrolytic copper refining processes. It is also recoverable from dust of blast furnace lead refinining. Although higher grades occur in gold deposits as tellurides, these deposits are generally too small or low grade to currently economically exploit for this purpose [2],[4]. Notably the Swedish Kankberg mine owned by the Swedish multinational Boliden AB boasts a very economic high-grade Au-Ag-Te-Bi deposit with proven and probable reserves of 677 tonnes Te as of 2021 [5].

1.3 Market Demand and Production

The US government anticipates production shortfalls by 2025. China produces 50% of the world's tellurium due its dominance in the solar cell panel market. The largest global producers are listed below

country	China	Russia	Japan	Canada	Uzbekistan	Sweden	USA
2022 production (ton)	340	80	70	50	50	40	unknown

Table 1: Production 2022

The USA has been importing Tellurium for its domestic consumption primarily from Canada, Germany, China and the Phillipines. Tellurium is a technically less important element because it is expensive to manufacture and other elements or compounds are often equivalent in use.[4]

	2013	2014	2015	2016	2017
China	150	180	210	279	281
USA	50	50	50	50	50
Russia	31	33	34	40	40
Sweden	24	31	33	39	35
Japan	31	32	34	28	34
Canada	12	9	9	18	17

Table 2: Production 2013-2017

1.4 Tellurium-related Companies

In Canada, 5N Plus (VNP TSX-V) is a leading global producer of specialty semiconductors and performance materials that includes in its production inventory a number of telluride compounds [7]. Its market performance since 2022 has been nothing short of stellar with share price experiencing 6-fold appreciation.

Copper producers such as Teck resources or Newmont are not surprisingly in some instances tellurium producers [9]. Pure plays are few and far between given the nature of its occurrence and overall rarity. One company that bills itself as "North America's only tellurium focused exploration company," First Tellurium (FTEL CSE) ostensibly has high-grade Te-Au-Ag deposits located in British Columbia and Colorado. [8]however this company appears to have nothing much with the properties, perhaps because their 2024 financial statement lists a net value (assets - liabilities) of roughly zero. In other words, they are one the thousands of publically-traded undead zombie companies on Canadian-listed exchanges. No further analysis was done on this company, however they do appear to have a side business purported in energy patents.

References

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