

VANTA

Rugged. Revolutionary. Productive.



Vanta™ handheld XRF analyzers are rugged and built for analytically demanding applications in the harshest environments. Vanta analyzers are IP 65* rated for protection against dust and water, are drop tested, and built to withstand a temperature range of -10 °C to 50 °C (14 °F to 122 °F).**

Vanta analyzers provide fast, accurate elemental analysis. Each device features Olympus' new Axon™ technology, a revolution in XRF signal processing that provides accurate, repeatable results for greater productivity and a fast return on investment. Vanta analyzers feature an intuitive interface and application-specific software so new users can work with the device with minimal training. Data is easily exported via Wi-Fi, Bluetooth®, or USB.

The Vanta Series

No matter the model, each Vanta analyzer is engineered for durability and analytical superiority. Olympus manufactures Vanta™ analyzers to suit a variety of applications depending on your needs.

M Series

Our most powerful Vanta analyzers feature exceptional performance to handle the most demanding applications. Each M Series analyzer comes equipped a large-area silicon drift detector, your choice of either a rhodium (Rh) or a tungsten (W) anode, and a 50 kV X-ray tube.

C Series

The C Series combine value with superior speed, limits of detection (LODs), and elemental range. Each C Series analyzer is equipped with a silicon drift detector and your choice of an Rh or W anode 40 kV X-ray tube, or a silver (Ag) anode at 50 kV X-ray tube.

VANTA Specifications

Dimensions (W × H × D)	8.3 cm × 28.9 cm × 24.2 cm (3.25 in. × 11.4 in. × 9.5 in.)
Weight	1.70 kg (3.75 lb) with battery, 1.48 kg (3.25 lb) without battery
Excitation Source	4-Watt X-ray tube with application optimized anode material (rhodium (Rh), silver (Ag), or tungsten (W)) M Series (Rh & W) and C Series (Ag): 8–50 kV C Series (Rh & W): 8–40 kV
Primary Beam Filtration	8-position auto selected filter per beam per mode
Detector	M Series: Large area Silicon Drift Detector C Series: Silicon Drift Detector
Power	Removable 14.4 V Li-Ion battery or 18 V power transformer 100-240 VAC, 50–60 Hz, 70 W max
Display	800 × 480 (WVGA) LCD with capacitive touch-screen supporting gesture control
Operating Environment	Temperature: -10 °C to 50 °C (continuous duty cycle with optional fan) Humidity: 10% to 90% relative humidity non-condensing
Drop Test	Military Standard 810-G 4-foot (1.3 M) drop test
IP Rating	M Series IP 64: dust tight and protected against water splashing from all directions C Series IP 65: dust tight and protected against water jets from all directions
Pressure Correction	Built-in barometer for automatic altitude and air density correction
GPS	Embedded GPS / GLONASS receiver
Operating System	Linux
Data Storage	4 GB embedded storage, micro SD slot for expandable storage
USB	(2) USB 2.0 type A host ports for accessories such as Wi-Fi, Bluetooth®, and USB flash drives. (1) USB 2.0 type mini-B port for connection to computer.
WiFi	Supports 802.11 b/g/n (2.4 GHz) via optional USB adapter
Bluetooth	Supports Bluetooth and Bluetooth Low-Energy via optional USB adapter
Aiming Camera	Full VGA CMOS camera
Panoramic Camera	5-megapixel CMOS camera with autofocus lens

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OLYMPUS SCIENTIFIC SOLUTIONS AMERICAS
is certified to ISO 9001, ISO 14001, and OHSAS 18001.

*M Series analyzers are IP 64 rated

** With optional fan. The fan assembly is IP 54 rated. Operates continuously at 33 °C without the fan.
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OLYMPUS[®]

Your Vision, Our Future

Handheld X-ray Fluorescence

VANTA for Geochemistry

VANTA

Rugged. Revolutionary. Productive.



The Right Answer in Any Environment



The Olympus Vanta™ handheld XRF provides immediate, on-site elemental measurements for a range of geochemical applications. Vanta analyzers provide power and flexibility across the entire mineral resource cycle:

- Greenfield and brownfield exploration
- Ore grade and process control
- Environmental monitoring and remediation
- Academic/educational research and teaching within the geological/environmental sciences

Every Vanta handheld XRF is IP 65* rated to withstand rain, dirt, and dust and are drop tested to department of defense standards (MIL-STD-810G) to help prevent breakages and costly repairs. Their rugged and durable design makes Vanta devices resistant to damage for greater uptime and a lower cost of ownership.

With our innovative new Axon™ technology, you get the right answer no matter the environment or working conditions. Vanta analyzers for geochemistry feature software designed in cooperation with industry experts to help meet the needs of mineral resource, environmental companies, and educational institutions. Integrated GPS enables users to instantly geo-reference exploration and environmental samples. Connectivity via Wi-Fi and Bluetooth® gives users the flexibility to send results to base in real-time and seamlessly integrate data into third-party geological software programs. Vanta analyzers also offer onboard spectra viewing to quickly discriminate spectral overlaps.

Vanta™ XRF analyzers are effectively used across a range of mineral deposit types including:

- Base metals such as Cu, Pb, Zn, Ag, and Mo
- Gold, including pathfinders, and litho-geochemistry
- Uranium +/- rare earth elements and pathfinders
- Nickel sulfide and laterite deposits
- Iron ore and bauxites
- Rare earth elements (REEs) such as La, Ce, Pr, and Nd
- REE pathfinders including Y, Th, and Nb
- Phosphates, potash, limestone, magnesite, and other industrial minerals
- Epithermal Sn, W, Mo, Bi, and Sb deposits
- Mineral sands such as Ti and Zr
- Coal, oil, and gas through mud logging and trace element chemistry

Mineral Exploration



Vanta™ analyzers offer rapid return on investment (ROI) by providing users with “decision quality” geochemical data much faster than traditional laboratory techniques. Rapid, accurate decision-making at the exploration stage enables field time to be used more effectively, maximizes exploration (drilling and analytical) budgets, and advances project timeframes.

Vanta analyzer’s easy-to-use interface can be customized with settings useful for specific sites, users, projects, and applications. Geologists can store multiple sample and matrix-specific calibration models for optimal performance depending on the minerals of interest at the specific site.

The durable design and advanced Axon™ technology found in every Vanta analyzer enables geologists to work in remote areas with confidence that the device is built to withstand harsh environments and that answers provided are reliable and repeatable. In mineral exploration applications, Vanta

analyzers are effective for:

- Due diligence during property acquisition
- Analyzing the qualitative chemistry of rock, chip, soil, and sediment samples at the early regional reconnaissance and mapping stages
- Gathering quantitative data during first-pass regional soil, sediment, till, and trenching stages
- Identifying mineralized trends and anomalies, defining drill targets, and extending soil sample lines
- Adapting sampling and mapping programs in real-time to maximize exploration budgets
- Pre-screening samples to maximize the efficiency of off-site laboratory testing
- Increasing sample density in the most prospective areas
- Analyzing air core, RAB, RC, and diamond core samples during the drilling phase as the samples come out of the ground

Ore Grade and Process Control



Vanta™ analyzers help mining companies maintain their profitability in many open-pit and underground mines and in their associated processing facilities. On-site labs generally take hours or days to provide results. With the Vanta handheld XRF, you can get the right answer well in advance of a laboratory result. In some mine-site situations, this can mean huge cost savings. Vanta analyzers enable mine geologists to engage in intelligent and accurate grade control and metallurgists to monitor the efficiency and fine-tune the beneficiation process in real time.

Vanta analyzers are pre-calibrated using a wide range of industry standard certified reference materials (CRMs) providing users with excellent out of the box accuracy. Simple, intuitive software features enable users to fine tune this factory calibration, where necessary, for optimal performance on different geological samples and matrices.

In ore grade and process control, Vanta handheld XRF analyzers provide measurable ROI through:

- Reduced reliance on mine-site labs by instant screening of open-pit blast hole samples
- Improved underground grade control when combined with appropriate sampling methodologies
- Analysis of stockpile material to aid blending and feeding of the mill
- Real-time analysis of feeds, precipitates, concentrates, and tailings for immediate adjustments in the processing plant
- Analysis of penalty elements in concentrates and Au bars
- Analysis of S and other elements to determine flux adjustments in samples
- Analysis of Si as a proxy for quartz to inform ball mill grind times and optimize recoveries
- Analysis of raffinates and various lean and rich liquid mixes in SX/EW operations
- Testing of liquid waste streams as part of hydromet processes, particularly in copper and precious metals plants



Environmental Monitoring and Remediation

Vanta™ handheld XRF analyzers are used to identify elements of interest in soil, sediment, dust, and tailings as part of typical environmental monitoring remediation processes in and around active and closed industrial properties. Some active operations are using handheld XRF analyzers to monitor SiO₂ dust on processing equipment, Pb use in fire assay labs, and control Hg and As vapors in production environments in Au refineries. To help customers meet regulatory requirements, Vanta analyzers act as a fast and reliable screening tool that provide quantitative records of environmental monitoring that are easily archived.

Academic Research and Education

Portable XRF equipment, like Vanta analyzers, are playing an increasing role in academic studies relating to geological and environmental research projects and as a teaching tool. Vanta analyzers can aid in-house university laboratory methods, support undergraduate and post-graduate research projects, and facilitate teaching methods during routine coursework. The rapid results provided by Vanta handheld XRF analyzers can help educate students in modern analytical methods, aid in the identification of all types of samples, and provide a deeper understanding of mineral deposition and ore genesis relating to mineral deposit studies.

Durable and Reliable for Any Job in Any Environment

Rugged

Mines and outdoor environments can be tough on electronic devices, often causing breakdowns that cost time and money. Vanta analyzers are durable for increased uptime and a low cost of ownership.

Vanta™ devices are drop tested and IP 65 rated dust and immersion resistant to protect against the hazards found in even the most challenging environments. They can withstand a temperature range of -10 °C to 50 °C (14 °F to 122 °F), so you achieve 100% uptime without waiting for your analyzer to cool, even in hot environments.** The detector shutter on silicon drift detector models helps prevent punctures so you can analyze rough surfaces with confidence.

Revolutionary

Every circuit, contour, and interface of Vanta handhelds is engineered to be the best of its kind. Vanta analyzers incorporate Olympus' new Axon™ technology, a breakthrough in XRF signal processing that delivers accurate and repeatable test results. Axon uses ultra-low-noise electronics enabling higher X-ray counts per second and faster results. Coupled with a new quad-core processor, Axon makes Vanta analyzers remarkably responsive, pushing the limits of performance so you get the best results in the least amount of time. Axon technology provides both test-to-test and instrument-to-instrument repeatability. Whether it's your first test on your first analyzer or your thousandth test with your hundredth analyzer, Vanta handheld XRF gives you the same result every time.

Productive

Vanta analyzers maximize user throughput and make data archiving easy. Application-specific software features improve user productivity for fast return on investment.

- A new, intuitive interface enables the user to quickly navigate the device's settings and software functions.
- The UI can be configured based on a customer's specific needs. Users can customize what software features and functions are displayed on the main screen.
- Data are easily exported via a USB flash drive, Wi-Fi, or Bluetooth®. Vanta analyzers are designed to enable powerful cloud applications.
- Vanta analyzers feature a clear, bright LCD touch screen that is readable in any light.
- Ergonomic buttons and an industrial-grade, push-button joystick enable users to easily navigate the system with gloved hands.

Olympus' Vanta handheld XRF analyzer offers embedded GPS so users can pair results with precise GPS coordinates to document and map the location of elements. The optional 5-megapixel panoramic camera combines images of XRF data with GPS coordinates for inclusive archiving and streamlined reporting which provides unmatched data traceability to the field.

Vanta Analyzers for Mining

The VMR and VCR models are the Vanta™ analyzers typically used for mineral exploration. No matter the model, the rugged, fast, reliable Vanta analyzer features Olympus' Axon™ technology, and is rated to pass a 4 foot drop test, and is rated to IP 65.*



M Series

Our most powerful Vanta analyzers feature exceptional performance to handle the most demanding applications and lowest limits of detection (LODs). Each VMR model comes equipped with a sensitive large area silicon drift detector and a 50 kV X-ray tube with a rhodium (Rh) anode.

C Series

The C Series Vanta analyzers combine value with superior speed, limits of detection (LODs), and elemental range. Each VCR model is equipped with a silicon drift detector, a 40 kV X-ray tube, and an Rh anode.

Olympus

Olympus is a leader in XRF technology with a reputation for quality and accuracy. The Olympus International Mining Group (IMG) is an internal group of natural resource specialists wholly focused on geochemical applications of XRF and XRD. The IMG has unparalleled expertise in utilizing portable XRF technology for a range of in-field geological scenarios. Olympus' global network of support staff provide a level of ongoing service to the customer that includes support for testing methods, specific calibrations, and user training.

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** With optional fan. The fan assembly is IP 54 rated. Operates continuously at 33 °C without the fan.

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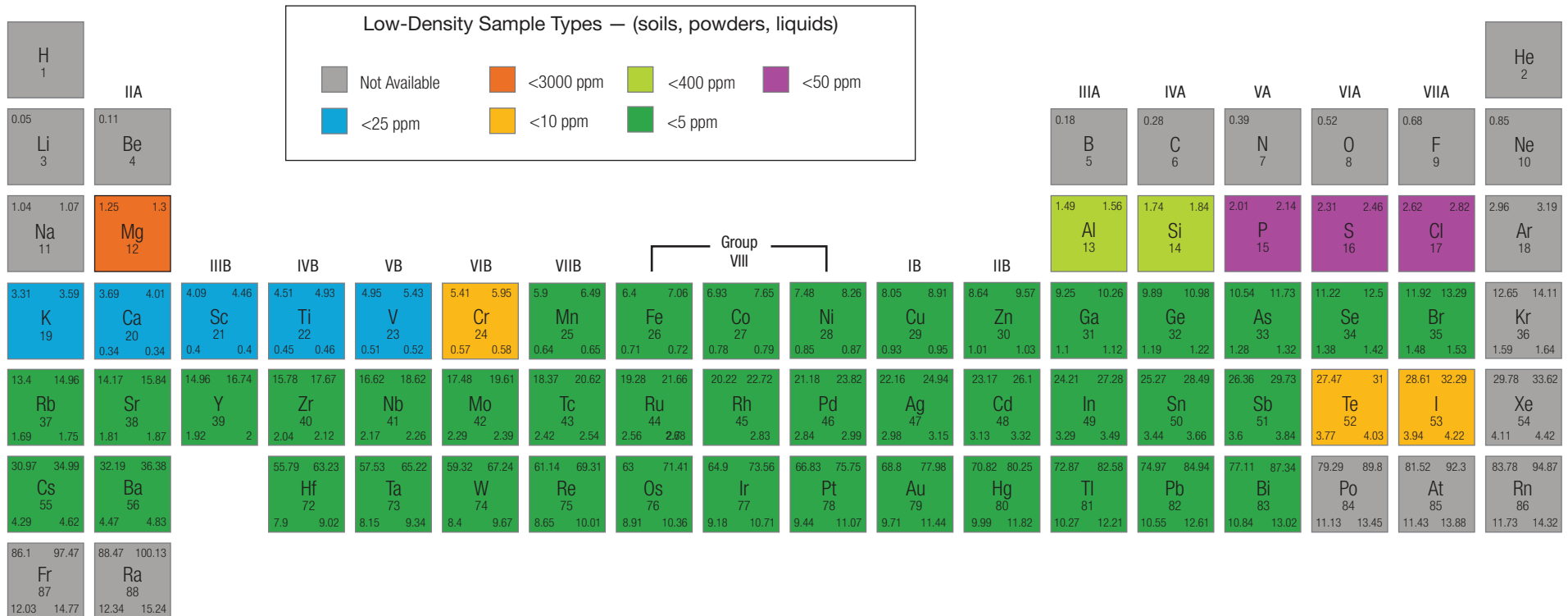
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Limits of Detection

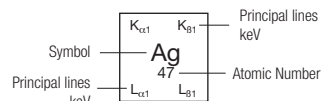


Lanthanides
57–71

33.44 La 57	37.8 Ce 58	34.72 Pr 59	39.26 Nd 60	36.03 Pm 61	40.75 Sm 62	37.36 Eu 63	42.27 Gd 64	38.72 Tb 65	43.83 Dy 66	40.12 Ho 67	45.41 Er 68	41.54 Tm 69	47.04 Yb 70	43 Lu 71	48.7 44.48 50.38 46 52.12 47.55 53.88 49.13 55.68 50.74 57.52 52.39 59.37 54.07 61.28
4.65 5.04	4.84 5.26	5.03 5.49	5.23 5.72	5.43 5.96	5.64 6.21	5.85 6.46	6.06 6.71	6.27 6.98	6.5 7.25	6.72 7.53	6.95 7.81	7.18 8.1	7.42 8.4	7.66 8.71	

Actinides
89–103

90.88 Ac 89	102.85 Th 90	93.35 Pa 91	105.61 U 92	95.87 Np 93	108.43 Pu 94	98.44 Am 95	111.3 Cm 96	101.00 Bk 97	114.18 Cf 98	103.65 Es 99	117.15 Fm 100	106.35 Md 101	120.16 No 102	109.10 Lr 103	123.24 111.90 126.36 114.75 129.54 117.65 132.78 120.60 136.08
12.65 15.71	12.97 16.2	13.29 16.7	13.61 17.22	13.95 17.74	14.28 18.28	14.62 18.83	14.96 19.39	15.31 19.97	15.66 20.56	16.02 21.17	16.38 21.79				



Detection limits are a function of testing time, sample matrix, and presence of interfering elements. Detection limits are estimates based on 2 minutes test times and detection confidence of 3σ (99.7% confidence). Interference-free detection limits are intended as guidelines; please contact Olympus to discuss your specific application. Rare earth element (REE) LODs are calculated using L lines in the absence of any transition-metal elements.

For alloy LODs, please see the separate alloy analysis LOD specifications.

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PHOTON ENERGIES, IN ELECTRON VOLTS, OF PRINCIPAL K- AND L-SHELL EMISSION LINES

Element	Symbol	Atomic #	K _{α1}	K _{β1}	L _{α1}	L _{β1}
Actinium	Ac	89	90.88	102.85	12.65	15.71
Aluminum	Al	13	1.49	1.56	0	0
Antimony	Sb	51	26.36	29.73	3.6	3.84
Argon	Ar	18	2.96	3.19	0	0
Arsenic	As	33	10.54	11.73	1.28	1.32
Astatine	At	85	81.52	92.3	11.43	13.88
Barium	Ba	56	32.19	36.38	4.47	4.83
Beryllium	Be	4	0.11	0	0	0
Bismuth	Bi	83	77.11	87.34	10.84	13.02
Boron	B	5	0.18	0	0	0
Bromine	Br	35	11.92	13.29	1.48	1.53
Cadmium	Cd	48	23.17	26.1	3.13	3.32
Calcium	Ca	20	3.69	4.01	0.34	0.34
Carbon	C	6	0.28	0	0	0
Cerium	Ce	58	34.72	39.26	4.84	5.26
Cesium	Cs	55	30.97	34.99	4.29	4.62
Chlorine	Cl	17	2.62	2.82	0	0
Chromium	Cr	24	5.41	5.95	0.57	0.58
Cobalt	Co	27	6.93	7.65	0.78	0.79
Copper	Cu	29	8.05	8.91	0.93	0.95
Dysprosium	Dy	66	46	52.12	6.5	7.25
Erbium	Er	68	49.13	55.68	6.95	7.81
Europium	Eu	63	41.54	47.04	5.85	6.46
Fluorine	F	9	0.68	0	0	0
Francium	Fr	87	86.1	97.47	12.03	14.77
Gadolinium	Gd	64	43	48.7	6.06	6.71
Gallium	Ga	31	9.25	10.26	1.1	1.12
Germanium	Ge	32	9.89	10.98	1.19	1.22
Gold	Au	79	68.8	77.98	9.71	11.44
Hafnium	Hf	72	55.79	63.23	7.9	9.02
Holmium	Ho	67	47.55	53.88	6.72	7.53
Indium	In	49	24.21	27.28	3.29	3.49
Iodine	I	53	28.61	32.29	3.94	4.22
Iridium	Ir	77	64.9	73.56	9.18	10.71
Iron	Fe	26	6.4	7.06	0.71	0.72
Krypton	Kr	36	12.65	14.11	1.59	1.64
Lanthanum	La	57	33.44	37.8	4.65	5.04
Lead	Pb	82	74.97	84.94	10.55	12.61
Lithium	Li	3	0.05	0	0	0
Lutetium	Lu	71	54.07	61.28	7.66	8.71
Magnesium	Mg	12	1.25	1.3	0	0
Manganese	Mn	25	5.9	6.49	0.64	0.65
Mercury	Hg	80	70.82	80.25	9.99	11.82
Molybdenum	Mo	42	17.48	19.61	2.29	2.39
Neodymium	Nd	60	37.36	42.27	5.23	5.72

Element	Symbol	Atomic #	K _{α1}	K _{β1}	L _{α1}	L _{β1}
Neon	Ne	10	0.85	0	0	0
Nickel	Ni	28	7.48	8.26	0.85	0.87
Niobium	Nb	41	16.62	18.62	2.17	2.26
Nitrogen	N	7	0.39	0	0	0
Osmium	Os	76	63	71.41	8.91	10.36
Oxygen	O	8	0.52	0	0	0
Palladium	Pd	46	21.18	23.82	2.84	2.99
Phosphorus	P	15	2.01	2.14	0	0
Platinum	Pt	78	66.83	75.75	9.44	11.07
Polonium	Po	84	79.29	89.8	11.13	13.45
Potassium	K	19	3.31	3.59	0	0
Praseodymium	Pr	59	36.03	40.75	5.03	5.49
Promethium	Pm	61	38.72	43.83	5.43	5.96
Protactinium	Pa	91	95.87	108.43	13.29	16.7
Radium	Ra	88	88.47	100.13	12.34	15.24
Radon	Rn	86	83.78	94.87	11.73	14.32
Rhenium	Re	75	61.14	69.31	8.65	10.01
Rhodium	Rh	45	20.22	22.72	2.7	2.83
Rubidium	Rb	37	13.4	14.96	1.69	1.75
Ruthenium	Ru	44	19.28	21.66	2.56	2.68
Samarium	Sm	62	40.12	45.41	5.64	6.21
Scandium	Sc	21	4.09	4.46	0.4	0.4
Selenium	Se	34	11.22	12.5	1.38	1.42
Silicon	Si	14	1.74	1.84	0	0
Silver	Ag	47	22.16	24.94	2.98	3.15
Sodium	Na	11	1.04	1.07	0	0
Strontium	Sr	38	14.17	15.84	1.81	1.87
Sulfur	S	16	2.31	2.46	0	0
Tantalum	Ta	73	57.53	65.22	8.15	9.34
Technetium	Tc	43	18.37	20.62	2.42	2.54
Tellurium	Te	52	27.47	31	3.77	4.03
Terbium	Tb	65	44.48	50.38	6.27	6.98
Thallium	Tl	81	72.87	82.58	10.27	12.21
Thorium	Th	90	93.35	105.61	12.97	16.2
Thulium	Tm	69	50.74	57.52	7.18	8.1
Tin	Sn	50	25.27	28.49	3.44	3.66
Titanium	Ti	22	4.51	4.93	0.45	0.46
Tungsten	W	74	59.32	67.24	8.4	9.67
Uranium	U	92	98.44	111.3	13.61	17.22
Vanadium	V	23	4.95	5.43	0.51	0.52
Xenon	Xe	54	29.78	33.62	4.11	4.42
Ytterbium	Yb	70	52.39	59.37	7.42	8.4
Yttrium	Y	39	14.96	16.74	1.92	2
Zinc	Zn	30	8.64	9.57	1.01	1.03
Zirconium	Zr	40	15.78	17.67	2.04	2.12