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The Inventory of
ELECTROMAGNETICALLY ENRICHED ISOTOPES
February 22, 1954

W.O. 108

C. P. Keim
C. E. Normand
Boyd Weaver

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OAK RIDGE NATIONAL LABORATORY

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ABSTRACT

This inventory lists the isotopes which have been concentrated electromagnetically, along with their enriched abundances, the element weights, and product forms available in milligram quantities to users on Atomic Energy Commission projects and in university and industrial laboratories. Occasional isotope lots are listed which have been exhausted but their enriched isotopic abundance indicates what may be expected on inventory replenishment.

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Stable Isotopes:		
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Antimony	34	Neodymium
Barium	36	Nickel
Boron	11	
Bromine.	25	Palladium
		Platinum
Cadmium.	30-31	Potassium.
Calcium.	14-15	
Carbon	11	Rhenium
Cerium	37	Rubidium
Chlorine	13	Ruthenium.
Chromium	17	
Copper	21-22	Samarium
		Selenium
Gadolinium	40	Silicon
Gallium	23	Silver
Germanium.	23	Strontium.
		Sulfur
Hafnium.	41	
		Tellurium.
Indium	31	Thallium
Iridium.	42	Tin.
Iron	17-20	Titanium
		Tungsten
Lanthanum.	37	
Lead	46-47	Vanadium
Lithium.	11	
		Zinc
Magnesium.	11-12	Zirconium.
Mercury	43-45	
Molybdenum	27-28	

THE INVENTORY

This report of electromagnetically enriched isotopes is revised frequently to include all isotopes which are available for use, or have been enriched and are in the process of chemical refinement. The isotopic abundance of each enriched sample and the amount of each isotope in the inventory are also listed. The list also includes some isotopes which have been concentrated but are not available at present.

All weights listed are element weights converted from compound weights by standard gravimetric factors.

Isotopic abundance data not in this report, such as concentrations of other isotopes in the lot or chemical purity, will be submitted upon request. Spectrographic analyses and complete isotopic abundance data will be forwarded with all shipments or as soon as available.

REQUESTS FOR ALLOCATION

Isotopes produced by the electromagnetic process are available in milligram quantities for distribution on loan and may be requested by using Form AEC-100. Copies of this form may be obtained from the Isotopes Division, U. S. Atomic Energy Commission, P. O. Box E, Oak Ridge, Tennessee.

The completed forms should be returned to the AEC Isotopes Division, Oak Ridge, Tennessee, who pass on all requests for allocation. If the requester wishes to mail the request forms and purchase order at one time to the Stable Isotope Research and Production Division they will forward the request forms to the AEC for approval.

PURCHASE ORDERS

All purchase orders are to be sent to Stable Isotope Research and Production Division, Attention: Dr. C. P. Keim, Oak Ridge National Laboratory, P. O. Box P, Oak Ridge, Tennessee. One copy of the approved Form AEC-100 must accompany the purchase order or have been forwarded to the supplier by the AEC Isotopes Division.

SHIPPING

Packaging and shipping of electromagnetically enriched isotopes by the supplier are done on Wednesday of each week in order that shipments may be processed most expeditiously.

LOAN PERIODS

Users of stable isotopes who need extensions of their loan periods should write the AEC Isotopes Division, Oak Ridge, Tennessee.

RETURNED ISOTOPES

All electromagnetically enriched isotopes are to be returned to the supplier when the user has completed his need for them. All unused and uncontaminated portions of the original shipment will be replaced in the inventory. If it is possible and economical to do so the supplier will recover enriched isotopes from products returned by the user.

Returned shipments are to be sent to Stable Isotope Research and Production Division, Attention: Dr. C. P. Keim, Oak Ridge National Laboratory, P. O. Box P, Oak Ridge, Tennessee. An outline of the treatment the isotopes have received should accompany the shipment to aid in chemical recovery of the isotopes.

SPECIAL SERVICES

All isotopes will be shipped in the product form listed in this inventory unless special arrangements are made with the supplier for further chemical processing; an estimate of the cost for additional chemistry will be furnished by the supplier if requested.

If isotopic abundance analysis services are needed by users they should contact the Isotope Research and Production Division, Oak Ridge National Laboratory, regarding their specific needs; an estimate of the cost will be furnished if requested.

The user is invited to contact the Stable Isotope Research and Production Division, ORNL, regarding the latest inventory quantities of electromagnetically enriched stable isotopes and their isotopic and chemical analyses; the Division is also ready to assist in technical problems relative to stable isotope uses.

SUMMARY OF PRODUCTION AND SHIPMENTS

<u>Atomic No.</u>	<u>Element</u>	<u>Production Completed</u>	<u>No. of Lots Now Available For Shipment</u>	<u>No. of Individual Shipments and Transfers Made</u>
51	Antimony	4	4	29
56	Barium	19	15	33
4	Beryllium	2	0	2
5	Boron	5	7	6
35	Bromine	2	2	6
48	Cadmium	19	15	78
20	Calcium	39	18	67
6	Carbon	3	2	3
58	Cerium	14	12	36
17	Chlorine	7	6	11
24	Chromium	14	9	66
29	Copper	13	11	33
31	Gallium	2	2	18
64	Gadolinium	7	3	1
32	Germanium	11	10	38
72	Hafnium	6	0	41
49	Indium	12	9	28
77	Iridium	2	2	3
26	Iron	79	60	82
57	Lanthanum	4	3	6
82	Lead	29	25	66
3	Lithium	24	4	118
12	Magnesium	17	14	49
80	Mercury	40	33	97
42	Molybdenum	31	26	94
60	Neodymium	29	29	59
28	Nickel	26	14	68
8	Oxygen	2	0	0
46	Palladium	6	6	11
78	Platinum	8	8	8
19	Potassium	31	16	60
75	Rhenium	2	2	18
37	Rubidium	2	2	12
44	Ruthenium	14	2	0
62	Samarium	23	16	72
34	Selenium	47	43	67
14	Silicon	9	10	26
47	Silver	8	8	18
38	Strontium	14	9	33
16	Sulfur	12	10	16
52	Tellurium	42	34	90
81	Thallium	16	12	29
50	Tin	63	55	135
22	Titanium	18	21	65
74	Tungsten	18	17	55
23	Vanadium	3	3	7
30	Zinc	16	10	66
40	Zirconium	27	22	71
	TOTAL	841	641	1,997

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Lithium					
Li 6	7.43	97.028	FY 745(c)	350	Li ₂ SO ₄
Li 6	7.43	99.78	GD 764(e)	540	Li ₂ SO ₄
Li 7	92.57	98.4	CU 379(a)	4,546	Li ₂ SO ₄
Li 7	92.57	99.96	GE 767(1)	4,925	Li ₂ SO ₄
Boron					
B 10	19.57	86.78	DP 481(a)	40	H ₃ BO ₃
B 10	19.57	*	FV 734(a)	1,679	H ₃ BO ₃
B 10	19.57	*	GF 768(a)	550	H ₃ BO ₃
B 11	80.43	*	HM 250(a)	10	H ₃ BO ₃
B 11	80.43	*	DP 482(a)	200	H ₃ BO ₃
B 11	80.43	97.77	FV 735(a)	275	H ₃ BO ₃
B 11	80.43	*	GF 769(a)	870	H ₃ BO ₃
Carbon					
C 12	98.91	99.96	FD 638(ah)	1,140	C
C 12	98.91	99.94	FD 638(aj)	9,950	C
Magnesium					
Mg 24	78.98	99.5	P 47(a)	1,570	MgO
Mg 24	78.98	98.36	Q 50(a)	192	MgO
Mg 24	78.98	99.52	BZ 288(a)	24	MgO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Magnesium (cont'd)					
Mg 24	78.98	99.2	BZ 288(b)	132	MgO
Mg 24	78.98	99.5	BZ 288(c)	2,201	MgO
Mg 24	78.98	99.4	BZ 288(d)	1,786	MgO
Mg 24	78.98	99.59	DZ 519(a)	3,274	MgO
Mg 25	10.03	62.59	Q 51(a)	20	MgO
Mg 25	10.03	65.67	Q 51(b)	14	MgO
Mg 25	10.03	86.8	BZ 289(a)	220	MgO
Mg 25	10.03	92.33	DZ 520(a)	1,219	MgO
Mg 26	10.99	96.16	P 49(a)	366	MgO
Mg 26	10.99	95.91	BZ 290(a)	213	MgO
Mg 26	10.99	98.12	DZ 521(a)	0	MgO
Silicon					
Si 28	92.17	99.4	AI-AJ 103-106(a)	1,796	SiO ₂
Si 28	92.17	98.1	BW 280(a)	7,510	SiO ₂
Si 28	92.17	99.16	EB 524(a)	9,041	SiO ₂
Si 28	92.17	*	GC 761(a)	9,550	SiO ₂
Si 29	4.71	68.62	EB 525(a)	0	SiO ₂
Si 29	4.71	*	GC 762(a)	670	SiO ₂
Si 30	3.12	63.9	AI-AJ 105-108(a)	50	SiO ₂
Si 30	3.12	49.6	BW 282(a)	350	SiO ₂
Si 30	3.12	64.04	EB 526(a)	48	SiO ₂
Si 30	3.12	*	GC 763(a)	690	SiO ₂

* - Analysis incomplete

** - Refinement incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Sulfur					
S 32	94.89	97.90	CX 391(a)	215	S
S 32	94.89	98.45	ES 596(a)	7,463	CdS
S 32	94.89	*	GB 757(a)	2,200	CdS
S 33	0.80	5.54	CX 392(a)	25	S
S 33	0.80	9.8	ES 597(a)	0	
S 33	0.80	*	GB 758(a)	350	CdS
S 34	4.29	20.65	CX 393(a)	0	
S 34	4.29	5.38	CX 393(b)	59	S
S 34	4.29	14.92	ES 598(a)	997	CdS
S 34	4.29	*	GB 759(a)	1,400	CdS
S 36	0.02	0.08	ES 599(a)	24	CdS
S 36	0.02	*	GB 760(a)	10	CdS
Chlorine					
Cl 35	75.4	92.4	DH 436(a)	0	
Cl 35	75.4	*	FW 736(a)	16,903	NaCl
Cl 35	75.4	*	FW 736(b)	8,824	NaCl
Cl 37	24.6	65.6	DH 438(a)	194	AgCl
Cl 37	24.6	*	FW 737(a)	72	NaCl
Cl 37	24.6	*	FW 737(b)	4,777	NaCl

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPIES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Potassium					
K 39	93.25	99.5	BJ 237(a)	1,592	KClO ₄
K 39	93.25	99.9	CM 346(a)	110	KCl
K 39	93.25	99.9	CM 346(ar)	9,920	KCl
K 39	93.25	99.94	DA 407(a)	19,225	KCl
K 39	93.25	99.74	DB 410(a)	5,659	KCl
K 39	93.25	99.89	DT 494(a)	9,384	KCl
K 39	93.25	99.96	EX 621(g)	18,470	KCl
K 39	93.25	99.94	EY 624(i)	24,977	KCl
K 39	93.25	99.83	FA 629(a)	10,473	KCl
K 40	0.011	7.75	EY 625(t)	0	
K 41	6.74	92.9	BJ 239(a)	65	KClO ₄
K 41	6.74	86.8	CM 348(a)	37	KCl
K 41	6.74	98.94	DT 496(a)	450	KCl
K 41	6.74	98.94	DT 496(ar)	65	KCl
K 41	6.74	99.21	EY 626(e)	588	KCl
K 41	6.74	99.21	EY 626(er)	35	KCl
K 41	6.74	87.75	FA 631(a)	239	KCl
Calcium					
Ca 40	96.96	98.6	V 61(b)	114	CaO
Ca 40	96.96	99.97	X 70(a)	1,060	CaO
Ca 40	96.96	98.9	BN 251(a)	5,825	CaCO ₃

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPEs

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIc ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Calcium (cont'd)					
Ca 40	96.96	99.83	DI 441(d)	35,259	CaCO ₃
Ca 40	96.96	99.98	EV 613(a)	28,530	CaCO ₃
Ca 40	96.96	99.98	FF 648(a)	44,756	CaCO ₃
Ca 40	96.96	*	FO 689(a)	97,500	CaCO ₃
Ca 42	0.64	28.3	DI 442(b)	393	CaCO ₃
Ca 42	0.64	82.52	EV 614(a)	20	CaCO ₃
Ca 42	0.64	64.17	FF 649(a)	355	CaCO ₃
Ca 42	0.64	**	FO 690(a)		
Ca 43	0.145	37.56	DI 443(b)	43	CaCO ₃
Ca 43	0.145	72.13	EV 615(a)	0	
Ca 43	0.145	67.95	FO 691(a)	160	CaCO ₃
Ca 44	2.06	85.4	BN 254(a)	40	CaCO ₃
Ca 44	2.06	97.90	EV 616(a)	488	CaCO ₃
Ca 44	2.06	97.99	FF 651(a)	400	CaCO ₃
Ca 44	2.06	**	FO 692(a)		
Ca 46	0.0033	10.16	FF 652(a)	0	
Ca 48	0.185	84.28	FO 694(a)	0	
Ca 48	0.185	7.49	FF 653(a)	10	CaCO ₃
Titanium					
Ti 46	7.97	84.26	BF 215(a)	100	TiO ₂
Ti 46	7.97	84.26	BF 215(ar)	83	TiO ₂

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Titanium (cont'd)					
Ti 46	7.97	82.68	EN 576(a)	309	TiO ₂
Ti 46	7.97	82.68	EN 576(ar)	490	TiO ₂
Ti 46	7.97	*	GA 752(a)	4,200	TiO ₂
Ti 47	7.41	82.05	BF 216(a)	85	TiO ₂
Ti 47	7.41	63.11	EN 577(a)	444	TiO ₂
Ti 47	7.41	*	GA 753(a)	2,630	TiO ₂
Ti 47	7.41	*	GA 753(b)	2,225	TiO ₂
Ti 48	73.50	99.23	BF 217(a)	50	TiO ₂
Ti 48	73.50	98.90	EN 578(a)	14,654	TiO ₂
Ti 48	73.50	98.90	EN 578(ar)	3,200	TiO ₂
Ti 48	73.50	*	GA 754(a)	35,625	TiO ₂
Ti 48	73.50	*	GA 754(b)	17,575	TiO ₂
Ti 49	5.64	77.62	BF 218(a)	37	TiO ₂
Ti 49	5.64	77.62	BF 218(ar)	45	TiO ₂
Ti 49	5.64	*	GA 755(a)	1,725	TiO ₂
Ti 49	5.64	*	GA 755(b)	4,000	TiO ₂
Ti 50	5.48	81.44	EN 580(a)	28	TiO ₂
Ti 50	5.48	*	GA 756(a)	1,830	TiO ₂
Ti 50	5.48	*	GA 756(b)	1,350	TiO ₂
Vanadium					
V 50	0.28	22.83	FM 683(b)	10	V ₂ O ₅
V 50	0.28	22.83	FM 683(br)	20	V ₂ O ₅

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPEs

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Vanadium (cont'd)					
V 51	99.72	>99.95	FB 633(a)	2,516	V ₂ O ₅
V 51	99.72	>99.98	FM 684(a)	26,265	V ₂ O ₅
Chromium					
Cr 50	4.40	88.3	EU 609(a)	393	Cr ₂ O ₃
Cr 52	83.73	99.14	D 11(a)	510	Cr ₂ O ₃
Cr 52	83.73	99.14	D 11(ar)	140	Cr ₂ O ₃
Cr 52	83.73	99.1	CD 310(a)	3,057	Cr ₂ O ₃
Cr 52	83.73	97.1	EU 610(a)	23,140	Cr ₂ O ₃
Cr 53	9.49	88.59	D 12(a)	56	Cr ₂ O ₃
Cr 53	9.49	92.1	CD 311(a)	14	Cr ₂ O ₃
Cr 53	9.49	90.06	EU 611(a)	6	Cr ₂ O ₃
Cr 54	2.38	83.1	CD 312(a)	145	Cr ₂ O ₃
Cr 54	2.38	88.95	EU 612(a)	0	
Iron					
Fe 54	5.90	55.47	V 3(a)	57	Fe ₂ O ₃
Fe 54	5.90	39.0	B 3(f)	268	Fe ₂ O ₃
Fe 54	5.90	81.06	E 14(a)	335	Fe ₂ O ₃
Fe 54	5.90	83.03	F 18(a)	32	Fe ₂ O ₃
Fe 54	5.90	49.2	AM 122(a)	343	Fe ₂ O ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Iron (cont'd)					
Fe 54	5.90	93.27	AZ 183(a)	16	Fe ₂ O ₃
Fe 54	5.90	87.9	BA 187(a)	10	Fe ₂ O ₃
Fe 54	5.90	87.9	BA 187(ar)	50	Fe ₂ O ₃
Fe 54	5.90	87.4	BB 194(a)	69	Fe ₂ O ₃
Fe 54	5.90	84.3	CI 328(a)	41	Fe ₂ O ₃
Fe 54	5.90	34.47	DO 477(a)	65,250	Fe ₂ O ₃
Fe 54	5.90	93.06	FC 634(a)	14	Fe ₂ O ₃
Fe 54	5.90	**	FN 685(a)		
Fe 54	5.90	**	FN 685(b)		
Fe 56	91.52	98.41	B 4(a)	4,270	Fe ₂ O ₃
Fe 56	91.52	98.5	B 4(e)	901	Fe ₂ O ₃
Fe 56	91.52	98.62	E 15(a)	10,403	Fe ₂ O ₃
Fe 56	91.52	97.42	F 19(a)	1,120	Fe ₂ O ₃
Fe 56	91.52	98.9	AM 123(a)	2,627	Fe ₂ O ₃
Fe 56	91.52	99.0	AZ 184(a)	12,451	Fe ₂ O ₃
Fe 56	91.52	98.5	BA 188(a)	35,471	Fe ₂ O ₃
Fe 56	91.52	98.3	BB 192(a)	9,818	Fe ₂ O ₃
Fe 56	91.52	96.5	CI 329(a)	51,056	Fe ₂ O ₃
Fe 56	91.52	99.84	CZ 404(f)	8,460	Fe ₂ O ₃
Fe 56	91.52	99.70	DO 478(a)	242,643	Fe ₂ O ₃
Fe 56	91.52	99.70	DO 478(ar)	76,218	Fe ₂ O ₃
Fe 56	91.52	99.70	DO 478(as)	27,594	Fe

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Iron (cont'd)					
Fe 56	91.52	*	FC 635(a)	18,171	Fe ₂ O ₃
Fe 56	91.52	*	FN 686(a)	304,226	Fe ₂ O ₃
Fe 56	91.52	**	FN 686(b)		
Fe 57	2.24	21.10	B 5(a)	62	Fe ₂ O ₃
Fe 57	2.24	30.5	B 5(f)	81	Fe ₂ O ₃
Fe 57	2.24	69.63	F 20(a)	15	Fe ₂ O ₃
Fe 57	2.24	33.2	AM 124(a)	69	Fe ₂ O ₃
Fe 57	2.24	77.6	BB 193(a)	65	Fe ₂ O ₃
Fe 57	2.24	51.91	CZ 405(f)	509	Fe ₂ O ₃
Fe 57	2.24	79.43	DK 449(a)	232	Fe ₂ O ₃
Fe 57	2.24	62.38	DL 453(a)	830	Fe ₂ O ₃
Fe 57	2.24	59.31	DL 453(d)	381	Fe ₂ O ₃
Fe 57	2.24	31.9	DL 453(e)	1,245	Fe ₂ O ₃
Fe 57	2.24	59.3	DL 453(f)	621	Fe ₂ O ₃
Fe 57	2.24	43.45	DL 453(j)	2,571	Fe ₂ O ₃
Fe 57	2.24	74.6	DM 459(a)	172	Fe ₂ O ₃
Fe 57	2.24	40.61	DL 463(a)	1,687	Fe ₂ O ₃
Fe 57	2.24	45.43	DL 463(b)	1,018	Fe ₂ O ₃
Fe 57	2.24	67.3	DL 463(e)	278	Fe ₂ O ₃
Fe 57	2.24	53.53	DL 463(j)	2,035	Fe ₂ O ₃
Fe 57	2.24	54.23	DL 463(k)	1,766	Fe ₂ O ₃
Fe 57	2.24	63.1	DL 467(c)	165	Fe ₂ O ₃
Fe 57	2.24	87.29	DN 475(a)	0	

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Iron (cont'd)					
Fe 57	2.24	83.44	FC 636(a)	22	Fe ₂ O ₃
Fe 57	2.24	**	FN 687(a)		
Fe 57	2.24	**	FN 687(b)		
Fe 58	0.34	22.0	C 8(b)	15	Fe ₂ O ₃
Fe 58	0.34	10.3	AM 125(a)	44	Fe ₂ O ₃
Fe 58	0.34	23.4	DL 454(f)	150	Fe ₂ O ₃
Fe 58	0.34	71.7	DL 454(m)	92	Fe ₂ O ₃
Fe 58	0.34	79.8	DL 464(l)	0	
Fe 58	0.34	75.7	DO 480(a)	117	Fe ₂ O ₃
Fe 58	0.34	42.0	DO 480(b)	183	Fe ₂ O ₃
Fe 58	0.34	34.8	DO 480(c)	37	Fe ₂ O ₃
Fe 58	0.34	74.20	FN 688(b)	37	Fe ₂ O ₃
Fe 58	0.34	59.65	FN 688(c)	104	Fe ₂ O ₃
Fe 58	0.34	55.74	FN 688(d)	72	Fe ₂ O ₃
Fe 58	0.34	57.31	FN 688(f)	197	Fe ₂ O ₃
Fe 58	0.34	65.85	FN 688(g)	82	Fe ₂ O ₃
Fe 58	0.34	78.66	FN 688(i)	82	Fe ₂ O ₃
Fe 58	0.34	78.02	FN 688(j)	86	Fe ₂ O ₃
Nickel					
Ni 58	67.4	98.51	K 33(a)	12	NiO
Ni 58	67.4	99.3	AS-AT 141-147(a)	34	NiO
Ni 58	67.4	98.36	DF 422(a)	5,484	NiO

* - Analysis incomplete

** - Refinement incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Nickel (cont'd)					
Ni 58	67.4	*	FJ 669(a)	36,817	NiO
Ni 60	26.7	94.4	J 28(a)	18	NiO
Ni 60	26.7	94.4	J 28(ar)	190	NiO
Ni 60	26.7	87.10	K 34(a)	680	NiO
Ni 60	26.7	97.7	AS-AT 142-148(a)	0	
Ni 60	26.7	*	FJ 670(a)	13,430	NiO
Ni 61	1.2	34.42	K 35(a)	28	NiO
Ni 61	1.2	80.9	AS-AT 143-149(a)	0	
Ni 61	1.2	*	FJ 671(a)	315	NiO
Ni 62	3.8	67.99	K 36(a)	50	NiO
Ni 62	3.8	94.7	AS-AT 144-150(a)	0	
Ni 62	3.8	*	DF 425(br)	30	Ni
Ni 62	3.8	*	FJ 672(a)	1,035	NiO
Ni 64	0.88	85.10	J 32(a)	10	NiO
Ni 64	0.88	97.4	AS-AT 146-152(a)	0	
Ni 64	0.88	*	FJ 674(a)	0	
Copper					
Cu 63	69.09	97.0	A 1(a)	650	CuO
Cu 63	69.09	97.0	A 1(ar)	960	CuO
Cu 63	69.09	99.35	J-K 31-37(a)	730	CuO
Cu 63	69.09	98.2	AV 161(cu)	100	CuO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Copper (cont'd)					
Cu 63	69.09	99.11	DF 426(a)	3,351	CuO
Cu 63	69.09	96.12	DL 455(a)	578	CuO
Cu 63	69.09	99.40	DU 497(a)	5,638	CuO
Cu 63	69.09	99.85	FJ 673(a)	4,033	CuO
Cu 65	30.91	93.81	A 2(ar)	461	CuO
Cu 65	30.91	90.6	AV 162(cu)	14	CuO
Cu 65	30.91	98.16	DU 498(a)	3,403	CuO
Zinc					
Zn 64	49.18	83.8	AG 97(a)	394	ZnO
Zn 64	49.18	93.12	EK 556(a)	1,165	ZnO
Zn 66	27.76	78.4	AH 100(a)	712	ZnO
Zn 66	27.76	93.79	EK 557(a)	5,200	ZnO
Zn 67	4.05	56.0	BK 242(a)	102	ZnO
Zn 67	4.05	60.46	EK 558(a)	146	ZnO
Zn 68	18.40	93.9	BN 243(a)	425	ZnO
Zn 68	18.40	95.47	EK 559(a)	3,075	ZnO
Zn 70	0.61	32.9	AH 102(a)	20	ZnO
Zn 70	0.61	32.0	BK 244(a)	39	ZnO
Zn 70	0.61	48.40	EK 560(a)	100	ZnO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Gallium					
Ga 69	60.00	98.42	EI 554(a)	3,850	Ga ₂ O ₃
Ga 71	40.00	98.08	EI 555(a)	625	Ga ₂ O ₃
Germanium					
Ge 70	20.63	88.1	BD-BE 205-210(a)	29	GeO ₂
Ge 70	20.63	91.38	FZ 747(a)	10,210	GeO ₂
Ge 72	27.41	89.2	BD-BE 206-211(a)	860	GeO ₂
Ge 72	27.41	94.86	FZ 748(a)	15,537	GeO ₂
Ge 73	7.84	68.9	BD-BE 207-212(a)	86	GeO ₂
Ge 73	7.84	78.04	FZ 749(a)	3,154	GeO ₂
Ge 74	36.37	95.2	BD-BE 208-213(a)	1,360	GeO ₂
Ge 74	36.37	95.80	FZ 750(a)	17,620	GeO ₂
Ge 76	7.75	81.02	FZ 751(a)	4,795	GeO ₂
Ge 76	7.75	79.3	BD-BE 209-214(a)	122	GeO ₂
Selenium					
Se 74	0.84	6.5	AK 109(a)	10	Se
Se 74	0.84	12.3	CY 397(ar)	255	Se
Se 74	0.84	12.08	DY 513(a)	229	Se
Se 74	0.84	33.06	FG 654(b)	0	
Se 76	9.15	43.5	AN 126(a)	10	Se
Se 76	9.15	41.5	BS 269(a)	600	Se

* - Analysis Incomplete
 ** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Selenium (cont'd)					
Se 76	9.15	54.8	CY 398(a)	542	Se
Se 76	9.15	54.8	CY 398(ar)	390	Se
Se 76	9.15	57.40	DY 514(a)	174	Se
Se 76	9.15	74.20	FG 655(a)	374	Se
Se 76	9.15	88.51	FG 655(b)	70	Se
Se 77	7.53	50.1	AK 110(a)	99	Se
Se 77	7.53	53.6	BS 270(a)	143	Se
Se 77	7.53	53.6	BS 270(ar)	500	Se
Se 77	7.53	49.4	CY 399(a)	565	Se
Se 77	7.53	58.40	DY 515(a)	302	Se
Se 77	7.53	74.22	FG 656(c)	203	Se
Se 77	7.53	83.16	FG 656(d)	10	Se
Se 77	7.53	86.58	FG 656(e)	10	Se
Se 77	7.53	91.73	FG 656(f)	0	
Se 77	7.53	86.00	FG 656(g)	8	Se
Se 78	23.62	79.3	AN 127(a)	68	Se
Se 78	23.62	79.3	AN 127(ar)	104	Se
Se 78	23.62	72.7	BS 271(a)	1,853	Se
Se 78	23.62	81.7	CY 400(a)	707	Se
Se 78	23.62	81.7	CY 400(ar)	1,026	Se
Se 78	23.62	82.56	DY 516(a)	69	Se
Se 78	23.62	90.24	FG 657(b)	376	Se
Se 78	23.62	96.55	FG 657(d)	145	Se

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPEs

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Selenium (cont'd)					
Se 80	49.97	86.7	AK 111(a)	281	Se
Se 80	49.97	94.6	BS 272(a)	1,520	Se
Se 80	49.97	94.6	BS 272(ar)	257	Se
Se 80	49.97	91.7	CY 401(a)	1,136	Se
Se 80	49.97	93.76	DY 517(a)	41	Se
Se 80	49.97	96.94	FG 658(a)	454	Se
Se 80	49.97	98.39	FG 658(b)	851	Se
Se 82	8.89	49.6	AN 128(a)	96	Se
Se 82	8.89	44.4	BS 273(ar)	1,087	Se
Se 82	8.89	51.6	CY 402(a)	314	Se
Se 82	8.89	51.6	CY 402(ar)	260	Se
Se 82	8.89	52.36	DY 518(a)	1,081	Se
Se 82	8.89	75.74	FG 659(a)	460	Se
Se 82	8.89	89.87	FG 659(b)	50	Se
Bromine					
Br 79	50.57	86.96	EJ 552(a)	190	AgBr
Br 81	49.43	96.81	EJ 553(a)	217	AgBr
Rubidium					
Rb 85	72.27	95.97	EW 619(a)	257	RbCl
Rb 87	27.73	89.62	EW 620(a)	680	RbCl

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Strontium					
Sr 84	0.56	63.68	EH 548(a)	0	
Sr 84	0.56	45.95	FL 679(a)	110	SrCO ₃
Se 86	9.86	69.9	Z 78(a)	60	SrO
Sr 86	9.86	69.9	Z 78(ar)	470	SrO
Sr 86	9.86	89.02	EH 549(a)	23	Sr(NO ₃) ₂
Sr 86	9.86	83.44	FL 680(a)	1,380	SrCO ₃
Sr 87	7.02	60.03	EH 550(a)	0	
Sr 87	7.02	42.82	FL 681(a)	1,460	SrCO ₃
Sr 88	82.6	98.9	Z 79(a)	1,049	SrO
Sr 88	82.6	99.5	BL 248(a)	322	SrSO ₄
Sr 88	82.6	99.67	EH 551(a)	39	Sr(NO ₃) ₂
Sr 88	82.6	99.63	FL 682(a)	13,480	SrCO ₃
Zirconium					
Zr 90	50.83	91.7	AA 80(a)	18	ZrO ₂
Zr 90	50.83	91.7	AA 80(ar)	460	ZrO ₂
Zr 90	50.83	98.0	CK 334(a)	7,045	ZrO ₂
Zr 90	50.83	98.0	CK 334(ar)	1,878	ZrO ₂
Zr 90	50.83	95.6	CV 381(a)	3,612	ZrO ₂
Zr 90	50.83	98.66	EE 539(a)	9,800	ZrO ₂
Zr 91	11.21	54.4	AA 81(a)	50	ZrO ₂
Zr 91	11.21	54.4	AA 81(ar)	100	ZrO ₂

* - Analysis Incomplete
 ** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPEs

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Zirconium (cont'd)					
Zr 91	11.21	86.6	CK 335(a)	33	ZrO ₂
Zr 91	11.21	86.6	CK 335(ar)	1,235	ZrO ₂
Zr 91	11.21	75.1	CV 382(a)	839	ZrO ₂
Zr 92	17.18	92.7	CK 336(a)	281	ZrO ₂
Zr 92	17.18	92.7	CK 336(ar)	2,149	ZrO ₂
Zr 92	17.18	89.8	CV 383(a)	96	ZrO ₂
Zr 92	17.18	95.38	EE 541(a)	5,461	ZrO ₂
Zr 94	17.79	82.1	AA 83(a)	94	ZrO ₂
Zr 94	17.79	82.1	AA 83(ar)	40	ZrO ₂
Zr 94	17.79	92.8	CK 337(a)	68	ZrO ₂
Zr 94	17.79	92.8	CK 337(ar)	1,786	ZrO ₂
Zr 94	17.79	80.9	CV 384(a)	861	ZrO ₂
Zr 94	17.79	80.9	CV 384(ar)	188	ZrO ₂
Zr 94	17.79	97.92	EE 542(a)	5,068	ZrO ₂
Zr 96	2.99	89.48	EE 543(a)	0	
Molybdenum					
Mo 92	15.04	95.5	AW 163(ar)	20	MoO ₃
Mo 92	15.04	87.57	FP 695(a)	144	MoO ₃
Mo 94	9.35	79.1	AW 164(a)	111	MoO ₃
Mo 94	9.35	84.91	FP 696(a)	60	MoO ₃
Mo 95	15.78	80.75	R-T 55(a)	804	MoO ₃
Mo 95	15.78	88.0	AW 165(a)	121	MoO ₃

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Molybdenum (cont'd)					
Mo 95	15.78	86.70	FP 697(a)	164	MoO ₃
Mo 95	15.78	91.27	FP 697(b)	105	MoO ₃
Mo 96	16.56	85.94	R-T 56(a)	2,797	MoO ₃
Mo 96	16.56	90.6	AW 166(a)	81	MoO ₃
Mo 96	16.56	92.0	FP 698(a)	10	MoO ₃
Mo 97	9.60	77.97	R-T 57(a)	474	MoO ₃
Mo 97	9.60	77.97	R-T 57(ar)	374	MoO ₃
Mo 97	9.60	75.4	AW 167(a)	510	MoO ₃
Mo 97	9.60	73.45	FP 699(a)	82	MoO ₃
Mo 97	9.60	89.63	FP 699(b)	119	MoO ₃
Mo 98	24.00	95.0	R-T 58(a)	486	MoO ₃
Mo 98	24.00	89.9	R-T 58(b)	393	MoO ₃
Mo 98	24.00	96.3	AW 168(a)	185	MoO ₃
Mo 98	24.00	95.15	FP 700(a)	545	MoO ₃
Mo 100	9.67	90.20	R-T 59(b)	40	MoO ₃
Mo 100	9.67	93.0	AW 169(a)	0	
Mo 100	9.67	86.65	FP 701(a)	25	MoO ₃
Ruthenium					
Ru 96	5.7	*	GJ 790(a)	250	Ru
Ru 96	5.7	*	GJ 790(b)	250	Ru
Ru 98	2.2	**	GJ 791(a)		
Ru 98	2.2	**	GJ 791(b)		

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Ruthenium (cont'd)					
Ru 99	12.8	**	GJ 792(a)		
Ru 99	12.8	**	GJ 792(b)		
Ru 100	12.7	**	GJ 793(a)		
Ru 100	12.7	**	GJ 793(b)		
Ru 101	17.0	**	GJ 794(a)		
Ru 101	17.0	**	GJ 794(b)		
Ru 102	31.3	**	GJ 795(a)		
Ru 102	31.3	**	GJ 795(b)		
Ru 104	18.3	**	GJ 796(a)		
Ru 104	18.3	**	GJ 796(b)		

Palladium

Pd 102	0.8	35.2	GG 770(a)	54	Pd
Pd 104	9.3	*	GG 771(a)	1,765	Pd
Pd 105	22.6	78.19	GG 772(a)	495	Pd
Pd 106	27.1	*	GG 773(a)	2,899	Pd
Pd 108	26.7	94.19	GG 774(a)	3,969	Pd
Pd 110	13.5	*	GG 775(a)	1,675	Pd

Silver

Ag 107	51.86	98.96	N 41(a)	39	AgCl
Ag 107	51.86	90.26	S-U 41(b)	115	AgCl

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Silver (cont'd)					
Ag 107	51.86	90.26	S-U 41(br)	2,143	Ag
Ag 107	51.86	96.10	EA 522(a)	1,030	AgCl
Ag 109	48.14	95.88	N 42(a)	31	AgCl
Ag 109	48.14	92.16	S-U 42(b)	22	AgCl
Ag 109	48.14	92.16	S-U 42(br)	1,644	Ag
Ag 109	48.14	99.54	EA 523(a)	1,135	AgCl
Cadmium					
Cd 106	1.22	19.94	AC 88(a)	44	CdO
Cd 106	1.22	32.9	CE 314(a)	60	CdO
Cd 108	0.89	14.2	AX 170(a)	98	CdO
Cd 108	0.89	24.8	CE 315(a)	0	
Cd 110	12.43	55.8	AX 171(a)	2,027	CdO
Cd 110	12.43	70.0	CE 316(a)	1,745	CdO
Cd 111	12.86	53.3	AC 89(a)	295	CdC
Cd 111	12.86	64.5	CE 317(a)	2,695	CdO
Cd 112	23.79	79.3	AX 172(a)	1,890	CdO
Cd 112	23.79	83.5	CE 318(a)	3,425	CdO
Cd 113	12.34	25.5	AB 86(a)	376	CdO
Cd 113	12.34	54.1	CE 319(a)	1,818	CdO
Cd 114	28.81	79.52	AC 90(a)	772	CdO
Cd 114	28.81	94.2	CE 320(a)	2,945	CdO
Cd 114	28.81	94.2	CE 320(ar)	316	CdO

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** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Cadmium (cont'd)					
Cd 116	7.66	71.2	CE 321(a)	115	CdO
Cd 116	7.66	71.2	CE 312(ar)	10	CdO
Indium					
In 113	4.22	22.8	BH 225(a)	83	In ₂ O ₃
In 113	4.22	16.8	CO 354(a)	290	In ₂ O ₃
In 113	4.22	65.4	CQ 358(a)	0	
In 113	4.22	14.2	DE 419(a)	734	In ₂ O ₃
In 113	4.22	59.58	ER 594(a)	0	
In 115	95.78	99.56	AD 92(a)	964	In ₂ O ₃
In 115	95.78	99.6	BH 226(a)	856	In ₂ O ₃
In 115	95.78	99.6	BH 226(ar)	470	In ₂ O ₃
In 115	95.78	99.9	CO 355(a)	14,563	In ₂ O ₃
In 115	95.78	99.94	ER 595(a)	30,900	In ₂ O ₃
In 115	95.78	99.94	ER 595(ar)	8,000	In ₂ O ₃
Tin					
Sn 112	1.00	72.49	EC 527(a)	0	
Sn 114	0.68	50.03	EC 528(a)	138	SnO ₂
Sn 114	0.68	45.10	FS 711(a)	82	SnO ₂
Sn 115	0.44	4.5	BI 229(a)	28	SnO ₂
Sn 115	0.44	14.0	EC 529(a)	535	SnO ₂

* - Analysis incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tin (cont'd)					
Sn 115	0.44	17.64	FS 712(a)	0	
Sn 115	0.44	*	FS 712(b)	90	SnO ₂
Sn 116	14.40	74.5	AY 176(a)	116	SnO ₂
Sn 116	14.40	74.5	AY 176(as)	49	Sn
Sn 116	14.40	58.4	BC 198(a)	388	SnO ₂
Sn 116	14.40	43.2	BI 230(a)	304	SnO ₂
Sn 116	14.40	89.57	CR 363(a)	4,144	SnO ₂
Sn 116	14.40	92.64	EC 530(a)	4,250	SnO ₂
Sn 116	14.40	90.89	FS 713(a)	4,425	SnO ₂
Sn 116	14.40	*	FS 713(b)	2,913	SnO ₂
Sn 117	7.68	75.3	BI 231(b)	288	SnO ₂
Sn 117	7.68	75.3	BI 231(bs)	182	Sn
Sn 117	7.68	73.93	CR 364(a)	4,748	SnO ₂
Sn 117	7.68	77.07	EC 531(a)	1,981	SnO ₂
Sn 117	7.68	61.83	FS 714(a)	2,607	SnO ₂
Sn 117	7.68	*	FS 714(b)	1,437	SnO ₂
Sn 118	24.07	69.3	AL 117(a)	918	SnO ₂
Sn 118	24.07	90.1	AY 178(a)	1,014	SnO ₂
Sn 118	24.07	90.1	AY 178(as)	346	Sn
Sn 118	24.07	91.8	BC 200(a)	63	SnO ₂
Sn 118	24.07	84.6	BI 232(a)	1,020	SnO ₂
Sn 118	24.07	93.26	CR 365(a)	8,510	SnO ₂
Sn 118	24.07	94.91	EC 532(a)	13,126	SnO ₂

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPIES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tin (cont'd)					
Sn 118	24.07	95.86	FS 715(a)	9,800	SnO ₂
Sn 118	24.07	*	FS 715(b)	4,970	SnO ₂
Sn 119	8.63	77.1	AY 179(a)	93	SnO ₂
Sn 119	8.63	77.1	AY 179(as)	48	Sn
Sn 119	8.63	64.4	BC 201(a)	382	SnO ₂
Sn 119	8.63	78.5	BI 233(a)	166	SnO ₂
Sn 119	8.63	78.25	CR 366(a)	5,024	SnO ₂
Sn 119	8.63	79.82	EC 533(a)	16,556	SnO ₂
Sn 119	8.63	*	FS 716(a)	4,400	SnO ₂
Sn 119	8.63	*	FS 716(b)	1,730	SnO ₂
Sn 120	32.53	93.5	AL 119(a)	420	SnO ₂
Sn 120	32.53	95.4	AY 180(a)	1,588	SnO ₂
Sn 120	32.53	95.4	AY 180(as)	464	Sn
Sn 120	32.53	72.6	BC 202(a)	3,155	SnO ₂
Sn 120	32.53	53.6	BI 234(a)	1,760	SnO ₂
Sn 120	32.53	97.01	CR 367(a)	18,120	SnO ₂
Sn 120	32.53	98.14	EC 534(a)	15,970	SnO ₂
Sn 120	32.53	98.21	FS 717(a)	16,592	SnO ₂
Sn 120	32.53	*	FS 717(b)	6,177	SnO ₂
Sn 122	4.68	45.8	BI 235(a)	13	SnO ₂
Sn 122	4.68	83.66	CR 368(a)	2,545	SnO ₂
Sn 122	4.68	88.92	EC 535(a)	1,984	SnO ₂
Sn 122	4.68	88.92	EC 535(au)	241	Sn

* - Analysis incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tin (cont'd)					
Sn 122	4.68	84.62	FS 718(a)	497	SnO ₂
Sn 122	4.68	*	FS 718(b)	955	SnO ₂
Sn 124	5.89	71.0	BI 236(ar)	125	SnO ₂
Sn 124	5.89	83.1	CR 369(au)	49	Sn
Sn 124	5.89	95.04	EC 536(a)	10	SnO ₂
Sn 124	5.89	95.04	EC 536(as)	1,350	Sn
Sn 124	5.89	90.26	FS 719(a)	526	SnO ₂
Sn 124	5.89	*	FS 719(b)	900	SnO ₂
Antimony					
Sb 121	57.25	99.4	AE 93(ar)	244	Sb
Sb 121	57.25	97.7	BT 274(a)	50	Sb
Sb 123	42.75	96.7	AE 94(ar)	372	Sb
Sb 123	42.75	95.6	BT 275(a)	377	Sb
Tellurium					
Te 120	0.094	22.3	DX 505(a)	0	
Te 122	2.46	77.8	AU 154(a)	19	Te
Te 122	2.46	86.24	DX 506(a)	50	Te
Te 122	2.46	81.72	FE 641(a)	93	Te
Te 123	0.86	34.9	AU 155(a)	7	Te
Te 123	0.86	60.91	DX 507(a)	67	Te

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tellurium (cont'd)					
Te 123	0.86	48.58	FE 642(a)	114	Te
Te 124	4.67	72.5	AU 156(a)	56	Te
Te 124	4.67	83.9	CA 295(a)	22	Te
Te 124	4.67	76.47	DX 508(a)	555	Te
Te 124	4.67	81.34	FE 643(a)	548	Te
Te 125	6.97	81.1	AU 157(a)	38	Te
Te 125	6.97	87.9	CA 296(ar)	2,130	Te
Te 125	6.97	40.5	CA 296(b)	264	Te
Te 125	6.97	81.65	DX 509(a)	200	Te
Te 125	6.97	80.53	FE 644(a)	1,262	Te
Te 126	18.69	93.2	AU 158(a)	1,496	Te
Te 126	18.69	95.4	CA 297(a)	1,547	Te
Te 126	18.69	95.4	CA 297(ar)	943	Te
Te 126	18.69	79.0	CA 297(b)	914	Te
Te 126	18.69	89.68	DX 510(b)	4,411	Te
Te 126	18.69	93.46	FE 645(a)	3,261	Te
Te 128	31.81	93.5	AU 159(a)	1,156	Te
Te 128	31.81	94.4	CA 298(a)	8,795	Te
Te 128	31.81	94.4	CA 298(ar)	714	Te
Te 128	31.81	91.8	CA 298(b)	1,594	Te
Te 128	31.81	94.0	CA 298(c)	111	Te
Te 128	31.81	82.32	DX 511(a)	5,760	Te
Te 128	31.81	96.47	FE 646(a)	4,881	Te

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tellurium (cont'd)					
Te 130	34.44	93.0	AU 160(a)	630	Te
Te 130	34.44	97.4	CA 299(a)	7,605	Te
Te 130	34.44	93.5	CA 299(br)	950	Te
Te 130	34.44	78.23	DX 512(a)	4,734	Te
Te 130	34.44	97.78	FE 647(a)	4,412	Te
Barium					
Ba 130	0.103	27.50	FT 720(a)	10	BaCO ₃
Ba 130	0.103	23.31	FU 727(a)	75	BaCO ₃
Ba 132	0.096	6.69	FT 721(a)	792	BaCO ₃
Ba 132	0.096	12.01	FU 728(a)	275	BaCO ₃
Ba 134	2.39	15.41	FT 722(a)	4,995	BaCO ₃
Ba 134	2.39	50.82	FU 729(a)	1,969	BaCO ₃
Ba 135	6.55	67.32	DG 432(a)	350	BaCO ₃
Ba 135	6.55	58.22	FU 730(a)	5,314	BaCO ₃
Ba 136	7.79	39.22	FT 724(a)	5,200	BaCO ₃
Ba 136	7.79	48.72	FU 731(a)	7,752	BaCO ₃
Ba 137	11.25	39.98	DG 434(a)	1,116	BaCO ₃
Ba 137	11.25	43.56	FU 732(a)	9,660	BaCO ₃
Ba 138	71.83	98.04	DG 435(a)	380	BaCO ₃
Ba 138	71.83	96.73	FT 726(a)	37,220	BaCO ₃
Ba 138	71.83	97.41	FU 733(a)	34,830	BaCO ₃

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Lanthanum					
La 138	0.087	0.597	EF 544(a)	349	La ₂ O ₃
La 138	0.087	*	GO 823(a)	840	La ₂ O ₃
La 139	99.913	99.96	EF 545(a)	8,640	La ₂ O ₃
La 139	99.913	*	GO 824(a)	27,925	La ₂ O ₃
Cerium					
Ce 136	0.195	29.97	FR 706(a)	188	CeO ₂
Ce 138	0.265	4.42	DW 502(a)	415	CeO ₂
Ce 138	0.265	10.22	FK 676(a)	195	CeO ₂
Ce 138	0.265	13.10	FR 707(a)	580	CeO ₂
Ce 140	88.44	98.5	CW 389(a)	3,786	CeO ₂
Ce 140	88.44	98.7	DD 417(a)	8,397	CeO ₂
Ce 140	88.44	98.7	DD 417(ar)	4,350	CeO ₂
Ce 140	88.44	99.25	DW 503(ar)	8,450	CeO ₂
Ce 140	88.44	99.55	FK 677(a)	6,263	CeO ₂
Ce 140	88.44	99.65	FR 708(a)	22,478	CeO ₂
Ce 142	11.10	87.4	DD 418(b)	29	CeO ₂
Ce 142	11.10	87.4	DD 418(br)	800	CeO ₂
Ce 142	11.10	84.42	DW 504(a)	1,330	CeO ₂
Ce 142	11.10	88.84	FK 678(a)	826	CeO ₂
Ce 142	11.10	90.08	FR 709(a)	5,863	CeO ₂

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Neodymium					
Nd 142	26.83	93.00	EQ 587(a)	20	Nd ₂ O ₃
Nd 142	26.83	93.00	EQ 587(ar)	1,830	Nd ₂ O ₃
Nd 142	26.83	*	FX 738(a)	498	Nd ₂ O ₃
Nd 142	26.83	*	FX 738(b)	1,280	Nd ₂ O ₃
Nd 142	26.83	*	GI 783(a)	24,250	Nd ₂ O ₃
Nd 143	12.10	83.93	EQ 588(a)	102	Nd ₂ O ₃
Nd 143	12.10	*	FX 739(a)	290	Nd ₂ O ₃
Nd 143	12.10	*	FX 739(b)	478	Nd ₂ O ₃
Nd 143	12.10	*	GI 784(a)	10,750	Nd ₂ O ₃
Nd 144	23.95	93.45	EQ 589(a)	91	Nd ₂ O ₃
Nd 144	23.95	93.45	EQ 589(ar)	1,850	Nd ₂ O ₃
Nd 144	23.95	*	FX 740(a)	348	Nd ₂ O ₃
Nd 144	23.95	*	FX 740(b)	413	Nd ₂ O ₃
Nd 144	23.95	*	GI 785(a)	18,800	Nd ₂ O ₃
Nd 145	8.36	78.60	EQ 590(a)	187	Nd ₂ O ₃
Nd 145	8.36	78.60	EQ 590(ar)	87	Nd ₂ O ₃
Nd 145	8.36	*	FX 741(a)	432	Nd ₂ O ₃
Nd 145	8.36	*	GI 786(a)	6,425	Nd ₂ O ₃
Nd 146	17.29	95.60	EQ 591(a)	21	Nd ₂ O ₃
Nd 146	17.29	95.60	EQ 591(ar)	1,000	Nd ₂ O ₃
Nd 146	17.29	*	FX 742(a)	440	Nd ₂ O ₃
Nd 146	17.29	*	GI 787(a)	10,200	Nd ₂ O ₃
Nd 148	5.80	89.85	EQ 592(ar)	69	Nd ₂ O ₃

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Neodymium (cont'd)					
Nd 148	5.80	*	FX 743(a)	70	Nd ₂ O ₃
Nd 148	5.80	*	FX 743(b)	30	Nd ₂ O ₃
Nd 148	5.80	*	GI 788(a)	3,080	Nd ₂ O ₃
Nd 150	5.67	94.76	EQ 593(ar)	155	Nd ₂ O ₃
Nd 150	5.67	*	FX 744(a)	70	Nd ₂ O ₃
Nd 150	5.67	*	GI 789(a)	2,050	Nd ₂ O ₃
Samarium					
Sm 144	3.13	72.13	EM 567(a)	0	
Sm 144	3.13	58.93	FH 660(a)	14	Sm ₂ O ₃
Sm 144	3.13	**	GM 813(a)		
Sm 147	15.12	78.35	FH 661(a)	345	Sm ₂ O ₃
Sm 147	15.12	81.63	EM 569(a)	14	Sm ₂ O ₃
Sm 147	15.12	**	GM 814(a)		
Sm 148	11.29	76.01	EM 570(a)	178	Sm ₂ O ₃
Sm 148	11.29	62.40	FH 662(a)	649	Sm ₂ O ₃
Sm 148	11.29	**	GM 815(a)		
Sm 149	13.87	71.53	EM 571(a)	34	Sm ₂ O ₃
Sm 149	13.87	73.01	FH 663(a)	423	Sm ₂ O ₃
Sm 149	13.87	**	GM 816(a)		
Sm 150	7.38	74.09	EM 572(a)	48	Sm ₂ O ₃
Sm 150	7.38	68.04	FH 664(a)	907	Sm ₂ O ₃

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Samarium (cont'd)					
Sm 150	7.38	**	GM 817(a)		
Sm 152	26.59	89.90	EM 573(a)	2,386	Sm ₂ O ₃
Sm 152	26.59	93.92	FH 665(a)	138	Sm ₂ O ₃
Sm 152	26.59	93.92	FH 665(ar)	4,700	Sm ₂ O ₃
Sm 152	26.59	**	GM 818(a)		
Sm 154	22.62	92.10	EM 574(a)	2,528	Sm ₂ O ₃
Sm 154	22.62	96.05	FH 666(a)	230	Sm ₂ O ₃
Sm 154	22.62	96.05	FH 666(ar)	2,150	Sm ₂ O ₃
Sm 154	22.62	99.07	GM 819(a)	4,925	Sm ₂ O ₃
Sm 154	22.62	**	GM 819(b)		
Gadolinium					
Gd 152	0.20	**	GK 798(a)		
Gd 154	2.15	**	GK 799(a)		
Gd 155	14.73	**	GK 800(a)		
Gd 156	20.47	*	GK 801(a)	11,350	Gd ₂ O ₃
Gd 157	15.68	**	GK 802(a)		
Gd 158	24.87	*	GK 803(a)	6,350	Gd ₂ O ₃
Gd 160	21.90	*	GK 804(a)	7,625	Gd ₂ O ₃

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Hafnium					
Hf 174	0.17	7.85	ET 602(a)	0	
Hf 174	0.17	**	GP 825(a)		
Hf 176	5.22	48.46	ET 603(a)	0	
Hf 176	5.22	**	GP 826(a)		
Hf 177	18.53	61.71	ET 604(a)	0	
Hf 177	18.53	**	GP 827(a)		
Hf 178	27.25	80.91	ET 605(a)	0	
Hf 178	27.25	**	GP 828(a)		
Hf 179	13.67	46.57	ET 606(a)	0	
Hf 179	13.67	**	GP 829(a)		
Hf 180	35.16	93.96	ET 607(a)	0	
Hf 180	35.16	*	GP 830(a)	6,800	HfO ₂
Tungsten					
W 180	0.16	9.00	BG 220(a)	0	
W 180	0.16	4.95	CL 340(a)	41	WO ₃
W 180	0.16	4.95	CL 340(ar)	54	WO ₃
W 180	0.16	6.95	EL 561(a)	80	WO ₃
W 182	26.21	94.25	BG 221(a)	46	WO ₃
W 182	26.21	91.58	CL 341(a)	1,639	WO ₃
W 182	26.21	92.33	EL 562(a)	10,785	WO ₃
W 183	14.33	86.21	BG 222(a)	115	WO ₃

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Tungsten (cont'd)					
W 183	14.33	82.01	CL 342(a)	745	WO ₃
W 183	14.33	82.63	EL 563(a)	5,664	WO ₃
W 184	30.61	95.72	BG 223(a)	290	WO ₃
W 184	30.61	91.14	CL 343(a)	106	WO ₃
W 184	30.61	91.14	CL 343(ar)	2,579	WO ₃
W 184	30.61	95.06	EL 564(a)	10,974	WO ₃
W 186	28.69	97.94	BG 224(a)	92	WO ₃
W 186	28.69	97.17	CL 344(a)	810	WO ₃
W 186	28.69	97.17	CL 344(ar)	372	WO ₃
W 186	28.69	97.54	EL 565(a)	10,265	WO ₃
Rhenium					
Re 185	37.31	85.38	CP 356(a)	2,120	Re
Re 187	62.69	98.22	CP 357(a)	730	Re
Iridium					
Ir 191	38.5	*	GL 810(a)	949	Ir
Ir 193	61.5	*	GL 811(a)	1,077	Ir
Platinum					
Pt 190	0.012	*	GH 776(a)	220	Pt

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Platinum (cont'd)					
Pt 192	0.78	*	GH 777(a)	215	Pt
Pt 192	0.78	*	GH 777(b)	875	Pt
Pt 194	32.8	*	GH 778(a)	11,841	Pt
Pt 195	33.7	*	GH 779(a)	3,079	Pt
Pt 196	25.4	*	GH 780(a)	6,854	Pt
Pt 198	7.23	*	GH 781(a)	362	Pt
Pt 198	7.23	*	GH 781(b)	1,010	Pt
Mercury					

Hg 196	0.16	8.44	DR 485(a)	0	
Hg 196	0.16	1.46	DR 485(c)	106	HgS
Hg 198	10.02	79.11	DR 486(a)	27	Hg(NO ₃) ₂
Hg 198	10.02	66.11	DR 486(b)	375	Hg(NO ₃) ₂
Hg 198	10.02	53.37	DR 486(c)	853	Hg(NO ₃) ₂
Hg 198	10.02	54.35	DR 486(d)	2,930	Hg(NO ₃) ₂
Hg 199	16.90	73.09	DR 487(as)	51	Hg
Hg 199	16.90	72.1	DR 487(b)	28	Hg(NO ₃) ₂
Hg 199	16.90	65.45	DR 487(d)	43	Hg(NO ₃) ₂
Hg 199	16.90	65.45	DR 487(ds)	507	Hg
Hg 200	23.10	91.39	DR 488(a)	44	Hg(NO ₃) ₂
Hg 200	23.10	86.45	DR 488(b)	75	Hg(NO ₃) ₂

* - Analysis Incomplete
 ** - Refinement Incomplete

*** - Hg(NO₃)₂ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Mercury(cont'd)					***
Hg 200	23.10	86.45	DR 488(bs)	505	Hg
Hg 200	23.10	80.85	DR 488(c)	749	Hg(NO ₃) ₂
Hg 200	23.10	74.90	DR 488(d)	3,478	Hg(NO ₃) ₂
Hg 200	23.10	64.66	DR 488(e)	1,420	Hg(NO ₃) ₂
Hg 200	23.10	76.28	DR 488(f)	489	Hg(NO ₃) ₂
Hg 201	13.20	71.8	DR 489(a)	26	Hg(NO ₃) ₂
Hg 201	13.20	71.8	DR 489(as)	80	Hg
Hg 201	13.20	62.48	DR 489(b)	38	Hg(NO ₃) ₂
Hg 201	13.20	62.48	DR 489(bs)	206	Hg
Hg 202	29.76	98.3	DR 490(a)	15	Hg(NO ₃) ₂
Hg 202	29.76	98.06	DR 490(b)	20	Hg(NO ₃) ₂
Hg 202	29.76	96.45	DR 490(d)	122	Hg(NO ₃) ₂
Hg 202	29.76	95.13	DR 490(e)	329	Hg(NO ₃) ₂
Hg 202	29.76	91.46	DR 490(f)	25	Hg(NO ₃) ₂
Hg 202	29.76	91.46	DR 490(fs)	120	Hg
Hg 202	29.76	87.87	DR 490(g)	354	Hg(NO ₃) ₂
Hg 202	29.76	80.27	DR 490(h)	4,334	Hg(NO ₃) ₂
Hg 202	29.76	75.75	DR 490(i)	825	Hg(NO ₃) ₂
Hg 204	6.86	89.17	DR 491(as)	95	Hg
Hg 204	6.86	77.61	DR 491(b)	138	Hg(NO ₃) ₂
Hg 204	6.86	69.80	DR 491(cs)	280	Hg
Hg 204	6.86	62.78	DR 491(d)	129	Hg(NO ₃) ₂

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Mercury (cont'd)					***
Hg 204	6.86	49.66	DR 491(e)	344	Hg(NO ₃) ₂
Hg 204	6.86	49.66	DR 491(es)	147	Hg
Hg 204	6.86	42.91	DR 491(f)	662	Hg(NO ₃) ₂
Hg 204	6.86	30.07	DR 491(g)	363	Hg(NO ₃) ₂
Hg 204	6.86	72.34	DR 491(h)	93	Hg(NO ₃) ₂
Hg 204	6.86	72.34	DR 491(hs)	143	Hg
Thallium					
Tl 203	29.51	75.6	BV 278(a)	119	Tl ₂ O ₃
Tl 203	29.51	58.8	CC 307(a)	404	Tl ₂ O ₃
Tl 203	29.51	34.1	CG 324(a)	83	Tl ₂ O ₃
Tl 203	29.51	61.0	CH 326(br)	2,250	Tl ₂ O ₃
Tl 205	70.49	89.5	BR 267(a)	1,261	Tl ₂ O ₃
Tl 205	70.49	95.2	BV 279(a)	919	Tl ₂ O ₃
Tl 205	70.49	98.7	BX 285(a)	125	Tl ₂ O ₃
Tl 205	70.49	86.1	CG 308(a)	444	Tl ₂ O ₃
Tl 205	70.49	95.6	CF 323(a)	107	Tl ₂ O ₃
Tl 205	70.49	91.8	CH 327(a)	1,615	Tl ₂ O ₃
Tl 205	70.49	90.5	CJ 333(a)	15	Tl ₂ O ₃

* - Analysis Incomplete
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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES					
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Lead					
Pb 204	1.37	7.8	O 43(a)	87	PbCrO ₄
Pb 204	1.37	16.69	AQ 135(ar)	38	PbCrO ₄
Pb 204	1.37	23.4	BO 257(a)	13	PbCrO ₄
Pb 204	1.37	27.0	CN 349(ar)	355	PbO
Pb 204	1.37	25.70	EO 581(a)	970	PbO
Pb 204	1.37	5.30	FQ 702(a)	925	PbO
Pb 206	26.26	75.67	O 44(a)	278	PbCrO ₄
Pb 206	26.26	77.9	AQ 136(a)	244	PbCrO ₄
Pb 206	26.26	71.3	BO 258(a)	238	PbCrO ₄
Pb 206	26.26	71.3	BO 258(ar)	1,018	PbCrO ₄
Pb 206	26.26	64.93	EO 582(a)	3,156	PbO
Pb 206	26.26	35.02	FQ 703(a)	8,726	PbO
Pb 207	20.82	61.55	O 45(a)	181	PbCrO ₄
Pb 207	20.82	48.2	AQ 137(a)	553	PbCrO ₄
Pb 207	20.82	48.2	AQ 137(ar)	512	PbCrO ₄
Pb 207	20.82	66.8	BO 259(a)	1,300	PbCrO ₄
Pb 207	20.82	66.8	BO 259(ar)	529	PbCrO ₄
Pb 207	20.82	61.06	EO 583(a)	4,400	PbO
Pb 207	20.82	26.81	FQ 704(a)	8,802	PbO
Pb 208	51.51	92.1	O 46(a)	33	PbCrO ₄
Pb 208	51.51	92.1	O 46(ar)	160	PbCrO ₄
Pb 208	51.51	82.10	AQ 138(a)	846	PbCrO ₄

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Lot	AVAILABLE FOR SHIPMENT	
	Natural	Enriched		Element Weight (milligrams)	Product Form
Lead (cont'd)					
Pb 208	51.51	96.6	BO 260(a)	160	PbO
Pb 208	51.51	95.8	CN 352(ar)	166	PbSO ₄
Pb 208	51.51	87.97	EO 584(a)	4,345	PbO
Pb 208	51.51	75.41	FQ 705(a)	9,090	PbO

* - Analysis Incomplete

** - Refinement Incomplete