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ELECTROMAGNETICALLY ENRICHED ISOTOPES

Inventory, January 31, 1953

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

Date Issued

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ISOTOPE RESEARCH AND PRODUCTION DIVISION
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OAK RIDGE NATIONAL LABORATORY

Operated by

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ABSTRACT

This inventory lists the isotopes which have been concentrated electromagnetically, along with the completed information on their enriched abundances, and the element weights and product forms available in milligram quantities to users on Atomic Energy Commission projects and in university and industrial laboratories.

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UNCLASSIFIEDTABLE OF CONTENTS

	<u>Page No.</u>
Introduction	5-6
Summary of Production and Shipments	7
Stable Isotopes:	
<u>Element</u>	<u>Page No.</u>
Antimony-----	8
Barium-----	8-9
Boron-----	9
Bromine-----	9
Cadmium-----	9-10
Calcium-----	10-11
Carbon-----	11
Cerium-----	11-12
Chlorine-----	12
Chromium-----	12-13
Copper-----	13
Gallium-----	13
Germanium-----	14
Hafnium-----	14
Indium-----	14-15
Iron-----	15-18
Lanthanum-----	18
Lead-----	18-19
Lithium-----	19-20
Magnesium-----	20
Mercury-----	21-22
Molybdenum-----	22-23
<u>Element</u>	
Neodymium-----	24
Nickel-----	24-25
Potassium-----	25-26
Rhenium-----	26
Rubidium-----	27
Samarium-----	27
Selenium-----	27-29
Silicon-----	29-30
Silver-----	30
Strontium-----	30-31
Sulfur-----	31
Tellurium-----	32-33
Thallium-----	33-34
Tin-----	34-37
Titanium-----	37-38
Tungsten-----	38-39
Vanadium-----	39
Zinc-----	39
Zirconium-----	40-41

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UNCLASSIFIEDINTRODUCTION

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

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

On all shipments material will be shipped in the product form shown unless special arrangements are made for further chemical processing.

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

Any users of isotopes who need mass analysis services should check with the Isotopes Division of the A. E. C. regarding their specific needs.

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

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Users of Stable Isotopes who need extensions of their loan periods should write The Isotopes Division, Atomic Energy Commission, Oak Ridge, Tennessee.

All purchase orders are to be sent to Dr. C. P. Keim, Oak Ridge National Laboratory, Y-12 Area, Oak Ridge, Tennessee.

SUMMARY OF PRODUCTION AND SHIPMENTS

<u>Atomic No.</u>	<u>Element</u>	<u>Production Completed</u>	<u>No. of Samples Now Available For Shipment</u>	<u>No. of Individual Shipments and Transfers Made</u>
51	Antimony	4	4	24
56	Barium	19	16	27
4	Beryllium	2	0	2
5	Boron	5	5	2
35	Bromine	2	2	3
48	Cadmium	19	16	73
20	Calcium	39	20	50
6	Carbon	3	2	3
58	Cerium	14	12	32
17	Chlorine	7	6	6
24	Chromium	14	9	66
29	Copper	13	11	24
31	Gallium	2	2	12
32	Germanium	11	10	35
72	Hafnium	6	6	30
49	Indium	12	9	22
26	Iron	79	60	72
57	Lanthanum	2	2	4
82	Lead	29	25	61
3	Lithium	24	9	95
12	Magnesium	17	14	42
80	Mercury	40	37	83
42	Molybdenum	31	26	83
60	Neodymium	7	8	54
28	Nickel	26	14	64
8	Oxygen	2	0	0
19	Potassium	31	23	50
75	Rhenium	2	2	14
37	Rubidium	2	2	4
62	Samarium	14	13	68
34	Selenium	47	43	61
14	Silicon	9	7	22
47	Silver	8	8	18
38	Strontium	14	9	31
16	Sulfur	9	6	16
52	Tellurium	42	34	84
81	Thallium	16	12	28
50	Tin	58	50	119
22	Titanium	14	10	60
74	Tungsten	18	17	50
23	Vanadium	3	3	6
30	Zinc	16	10	53
40	Zirconium	27	22	67
	TOTAL	760	596	1,720

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Antimony						
Sb 121	57.25	99.4	AE	93(a)	0	
Sb 121	57.25	99.4	AE	93(ar)	556	Sb
Sb 121	57.25	97.7	BT	274(a)	50	Sb
Sb 123	42.75	96.7	AE	94(a)	0	
Sb 123	42.75	96.7	AE	94(ar)	573	Sb
Sb 123	42.75	95.6	BT	275(a)	377	Sb
Barium						
Ba 130	0.103	27.50	FT	720(a)	35	BaCO ₃
Ba 130	0.103	23.31	FU	727(a)	85	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	51.39	DG	431(a)	0	
Ba 134	2.39	*	FT	722(a)	4,985	BaCO ₃
Ba 134	2.39	*	FU	729(a)	1,963	BaCO ₃
Ba 135	6.55	67.32	DG	432(a)	751	BaCO ₃
Ba 135	6.55	*	FU	730(a)	5,308	BaCO ₃
Ba 136	7.79	50.02	DG	433(a)	183	BaCO ₃
Ba 136	7.79	*	FT	724(a)	5,015	BaCO ₃
Ba 136	7.79	*	FU	731(a)	7,746	BaCO ₃
Ba 137	11.25	38.98	DG	434(a)	1,116	BaCO ₃
Ba 137	11.25	*	FU	732(a)	10,656	BaCO ₃
Ba 138	71.83	98.04	DG	435(a)	1,380	BaCO ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Barium (Cont'd)						
Ba 138	71.83	*	FT	726(a)	37,214	BaCO ₃
Ba 138	71.83	*	FU	733(a)	34,824	BaCO ₃
Boron						
B 10	19.57	86.78	DP	481(a)	40	H ₃ BO ₃
B 10	19.57	*	FV	734(a)	2,179	H ₃ BO ₃
B 11	80.43	*	BM	250(a)	10	H ₃ BO ₃
B 11	80.43	*	DP	482(a)	200	H ₃ BO ₃
B 11	80.43	*	FV	735(a)	2,000	H ₃ BO ₃
Bromine						
Br 79	50.57	86.96	EJ	552(a)	291	AgBr
Br 81	49.43	96.81	EJ	553(a)	268	AgBr
Cadmium						
Cd 106	1.22	19.94	AC	88(a)	44	CdO
Cd 106	1.22	32.9	CD	314(a)	0	
Cd 108	0.89	14.2	AX	170(a)	98	CdO
Cd 108	0.89	24.8	CD	315(a)	16	CdO
Cd 110	12.43	55.8	AX	171(a)	2,027	CdO
Cd 110	12.43	70.0	CE	316(a)	1,918	CdO
Cd 111	12.86	53.3	AC	89(a)	295	CdO
Cd 111	12.86	64.5	CE	317(a)	2,941	CdO

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Cadmium (Cont'd)						
Cd 112	23.79	79.3	AX	172(a)	1,890	CdO
Cd 112	23.79	83.5	CE	318(a)	3,414	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)	2,767	CdO
Cd 114	28.81	94.2	CE	320(ar)	316	CdO
Cd 116	7.66	71.2	CE	321(a)	31	CdO
Cd 116	7.66	71.2	CE	321(ar)	10	CdO
Calcium						
Ca 40	96.96	98.6	V	61(b)	114	CaO
Ca 40	96.96	99.97	X	70(a)	1,048	CaO
Ca 40	96.96	98.9	BN	251(a)	5,825	CaCO ₃
Ca 40	96.96	99.83	DI	441(d)	35,259	CaCO ₃
Ca 40	96.96	99.98	EV	613(a)	28,733	CaCO ₃
Ca 40	96.96	99.98	FF	648(a)	44,756	CaCO ₃
Ca 40	96.96	**	FO	689(a)		
Ca 42	0.64	28.3	DI	442(b)	393	CaCO ₃
Ca 42	0.64	82.52	EV	614(a)	218	CaCO ₃
Ca 42	0.64	64.17	FF	649(a)	455	CaCO ₃
Ca 42	0.64	**	FO	690(a)		
Ca 43	0.145	37.56	DI	443(b)	43	CaCO ₃

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Calcium (Cont'd)						
Ca 43	0.145	72.13	EV	615(a)	15	CaCO ₃
Ca 43	0.145	68.04	FF	650(a)	0	
Ca 43	0.145	67.95	FO	691(a)	295	CaCO ₃
Ca 44	2.06	85.4	BN	254(a)	40	CaCO ₃
Ca 44	2.06	96.2	CS	373(a)	85	CaCO ₃
Ca 44	2.06	91.9	DI	444(a)	134	CaCO ₃
Ca 44	2.06	97.90	EV	616(a)	739	CaCO ₃
Ca 44	2.06	97.99	FF	651(a)	659	CaCO ₃
Ca 44	2.06	**	FO	692(a)		
Ca 46	0.0033	10.16	FF	652(a)	0	
Ca 46	0.0033	9.55	FO	693(a)	13	CaCO ₃
Ca 48	0.185	84.28	FO	694(a)	32	CaCO ₃
Ca 48	0.185	7.49	FF	653(a)	10	CaCO 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
Cerium						
Ce 136	0.195	29.97	FR	706(a)	249	CeO ₂
Ce 138	0.265	4.42	DW	502(a)	290	CeO ₂
Ce 138	0.265	10.22	FK	676(a)	195	CeO ₂
Ce 138	0.265	13.10	FR	707(a)	657	CeO ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Cerium (Cont'd)						
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	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	84.42	DW	504(a)	1,330	CeO ₂
Ce 142	11.10	88.84	FK	678(a)	926	CeO ₂
Ce 142	11.10	90.08	FR	709(a)	5,863	CeO ₂
Chlorine						
Cl 35	75.4	79.5	AV	161(c1)	18	AgCl
Cl 35	75.4	92.4	DH	436(a)	0	AgCl
Cl 35	75.4	*	FW	736(a)	17,603	NaCl
Cl 35	75.4	*	FW	736(b)	8,824	NaCl
Cl 37	24.6	65.6	DH	438(a)	97	AgCl
Cl 37	24.6	*	FW	737(a)	5,672	NaCl
Cl 37	24.6	*	FW	737(b)	4,777	NaCl
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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Chromium (Cont'd)						
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	88.95	EU	612(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)	203	CuO
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)	13,146	CuO
Cu 63	69.09	*	FJ	673(a)	9,426	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)	11,265	CuO
Gallium						
Ga 69	60.00	98.42	EI	554(a)	11,807	Ga ₂ O ₃
Ga 71	40.00	98.08	EI	555(a)	2,211	Ga ₂ O ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Germanium						
Ge 70	20.63	88.1	BD-BE	205-210(a)	29	GeO ₂
Ge 70	20.63	91.38	FZ	747(a)	10,715	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)	3,654	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)	17,640	GeO ₂
Ge 76	7.75	79.3	BD-BE	209-214(a)	122	GeO ₂
Ge 76	7.75	81.02	FZ	751(a)	4,897	GeO ₂
Hafnium						
Hf 174	0.17	7.85	ET	602(a)	53	HfO ₂
Hf 176	5.22	48.46	ET	603(a)	98	HfO ₂
Hf 177	18.53	61.71	ET	604(a)	788	HfO ₂
Hf 178	27.25	80.91	ET	605(a)	1,448	HfO ₂
Hf 179	13.67	46.57	ET	606(a)	578	HfO ₂
Hf 180	35.16	93.96	ET	607(a)	1,351	HfO ₂
Indium						
In 113	4.22	16.8	CO	354(a)	415	In ₂ O ₃
In 113	4.22	65.4	CQ	358(a)	0	
In 113	4.22	14.2	DE	419(a)	1,735	In ₂ O ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Indium (Cont'd)						
In 113	4.22	59.58	ER	594(a)	727	In ₂ O ₃
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)	31,900	In ₂ O ₃
In 115	95.78	99.94	ER	595(ar)	11,000	In ₂ O ₃
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)	17	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
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	87.4	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)	67,252	Fe ₂ O ₃
Fe 54	5.90	93.06	FC	634(a)	540	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)	3,235	Fe ₂ O ₃

* - Analysis Incomplete

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ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Iron (Cont'd)						
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)	10,690	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
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)	24	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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Iron (Cont'd)						
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)	1,122	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)	184	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	
Fe 57	2.24	83.44	FC	636(a)	1,244	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)	39	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)	484	Fe ₂ O ₃
Fe 58	0.34	34.8	DO	480(c)	37	Fe ₂ O ₃

* - Analysis Incomplete

** -- Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Iron (Cont'd)						
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)	372	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
Lanthanum						
La 138	0.087	0.597	EF	544(a)	850	La ₂ O ₃
La 139	99.913	99.96	EF	545(a)	16,641	La ₂ O ₃
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)	891	PbSO ₄
Pb 204	1.37	25.70	EO	581(a)	673	PbO
Pb 204	1.37	5.30	FQ	702(a)	3,170	PbO
Pb 206	26.26	75.67	O	44(a)	278	PbCrO ₄
Pb 206	26.26	77.9	AQ	136(a)	255	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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Lead (Cont'd)						
Pb 206	26.26	81.0	CN	350(a)	0	
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)	998	PbCrO ₄
Pb 207	20.82	66.8	BO	259(ar)	529	PbCrO ₄
Pb 207	20.82	61.06	EO	583(a)	4,609	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
Pb 208	51.51	96.6	BO	260(a)	234	PbO
Pb 208	51.51	95.8	CN	352(ar)	166	PbSO ₄
Pb 208	51.51	87.97	EO	584(a)	23,395	PbO
Pb 208	51.51	75.41	FQ	705(a)	9,090	PbO
Lithium						
Li 6	7.43	99.4	CT	376(a)	0	
Li 6	7.43	95.2	ED	537(a)	225	Li ₂ SO ₄
Li 6	7.43	95.5	ED	537(b)	15	Li ₂ SO ₄
Li 6	7.43	88.22	EZ	627(e)	12	Li ₂ SO ₄

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Lithium (Cont'd)						
Li 6	7.43	94.07	FI	667(a)	25	Li ₂ SO ₄
Li 7	92.57	99.91	I	26(a)	10	Li ₂ SO ₄
Li 7	92.57	99.5	AR	140(a)	711	Li ₂ SO ₄
Li 7	92.57	99.8	BQ	265(ar)	216	Li ₂ SO ₄
Li 7	92.57	98.4	CU	379(a)	4,546	Li ₂ SO ₄
Li 7	92.57	99.86	EZ	628(e)	5,565	Li ₂ SO ₄
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)	2,527	MgO
Mg 24	78.98	99.2	BZ	288(b)	132	MgO
Mg 24	78.98	99.5	BZ	288(c)	2,251	MgO
Mg 24	78.98	99.4	BZ	288(d)	1,786	MgO
Mg 24	78.98	99.59	DZ	519(a)	1,804	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)	1,470	MgO
Mg 26	10.99	96.16	P	49(a)	416	MgO
Mg 26	10.99	95.91	BZ	290(a)	213	MgO
Mg 26	10.99	98.12	DZ	521(a)	783	MgO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form±
Mercury						
Hg 196	0.16	8.44	DR	485(a)	0	
Hg 196	0.16	1.46	DR	485(c)	347	Hg(NO ₃) ₂
Hg 198	10.02	79.11	DR	486(a)	78	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(a)	45	Hg(NO ₃) ₂
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	62.51	DR	487(e)	0	
Hg 200	23.10	91.39	DR	488(a)	97	Hg(NO ₃) ₂
Hg 200	23.10	86.45	DR	488(b)	119	Hg(NO ₃) ₂
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	62.48	DR	489(b)	90	Hg(NO ₃) ₂
Hg 201	13.20	57.90	DR	489(c)	230	Hg(NO ₃) ₂
Hg 201	13.20	57.3	DR	489(d)	178	Hg(NO ₃) ₂
Hg 201	13.20	51.48	DR	489(e)	121	Hg(NO ₃) ₂
Hg 202	29.76	98.3	DR	490(a)	46	Hg(NO ₃) ₂
Hg 202	29.76	98.06	DR	490(b)	20	Hg(NO ₃) ₂

* - Analysis Incomplete

** - Refinement Incomplete

 $\pm$ - Hg(NO₃)₂ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form ±
Mercury (Cont'd)						
Hg 202	29.76	97.33	DR	490(c)	55	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(a)	0	
Hg 204	6.86	77.61	DR	491(b)	189	Hg(NO ₃) ₂
Hg 204	6.86	62.78	DR	491(d)	129	Hg(NO ₃) ₂
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
Molybdenum						
Mo 92	15.04	92.07	R-T	53(a)	48	MoO ₃
Mo 92	15.04	95.5	AW	163(ar)	225	MoO ₃
Mo 92	15.04	87.57	FP	695(a)	194	MoO ₃
Mo 94	9.35	79.1	AW	164(a)	111	MoO ₃

* - Analysis Incomplete

** - Refinement Incomplete

 $\pm$ - Hg(NO₃)₂ is in Aqueous Solution

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Molybdenum (Cont'd)						
Mo 94	9.35	*	FP	696(a)	128	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
Mo 95	15.78	88.0	AW	165(ar)	182	MoO ₃
Mo 95	15.78	*	FP	697(a)	156	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)	362	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)	284	MoO ₃
Mo 97	9.60	75.4	AW	167(a)	510	MoO ₃
Mo 97	9.60	*	FP	699(a)	74	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)	487	MoO ₃
Mo 98	24.00	*	FP	700(a)	536	MoO ₃
Mo 100	9.67	90.20	R-T	59(b)	40	MoO ₃
Mo 100	9.67	93.0	AW	169(a)	25	MoO ₃
Mo 100	9.67	86.65	FP	701(a)	203	MoO ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES						
Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Neodymium						
Nd 142	26.83	93.00	EQ	587(a)	70	Nd ₂ O ₃
Nd 142	26.83	**	FX	738(a)		
Nd 143	12.10	83.93	EQ	588(a)	102	Nd ₂ O ₃
Nd 143	12.10	**	FX	739(a)		
Nd 144	23.95	93.45	EQ	589(a)	91	Nd ₂ O ₃
Nd 144	23.95	**	FX	740(a)		
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)		
Nd 146	17.29	95.60	EQ	591(a)	62	Nd ₂ O ₃
Nd 146	17.29	**	FX	742(a)		
Nd 148	5.80	89.85	EQ	592(a)	0	
Nd 148	5.80	89.85	EQ	592(ar)	189	Nd ₂ O ₃
Nd 148	5.80	**	FX	743(a)		
Nd 150	5.67	94.76	EQ	593(a)	0	
Nd 150	5.67	94.76	EQ	593(ar)	170	Nd ₂ O ₃
Nd 150	5.67	**	FX	744(a)		
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)	5,485	NiO
Ni 58	67.4	*	FJ	669(a)	36,817	NiO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Nickel (Cont'd)						
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)	570	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)	1,462	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	
Potassium						
K 39	93.25	99.5	BJ	237(a)	1,592	KClO ₄
K 39	93.25	99.9	CM	346(a)	35	KCl
K 39	93.25	99.9	CM	346(ar)	9,920	KCl
K 39	93.25	99.94	DA	407(a)	19,428	K ₂ SO ₄
K 39	93.25	99.74	DB	410(a)	5,659	KCl
K 39	93.25	99.89	DT	494(a)	9,384	KCl

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Potassium (Cont'd)						
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	1.31	DA	408(a)	10	KCl
K 40	0.011	0.40	DB	411(a)	150	KCl
K 40	0.011	0.40	DB	411(ar)	318	KCl
K 40	0.011	7.13	DT	495(a)	0	
K 40	0.011	3.64	EX	622(u)	7	KCl
K 40	0.011	7.75	EY	625(t)	10	K ₂ SO ₄
K 40	0.011	0.978	FA	630(a)	33	KCl
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)	604	KCl
K 41	6.74	98.94	DT	496(ar)	65	KCl
K 41	6.74	99.20	EX	623(e)	69	KCl
K 41	6.74	99.21	EY	626(e)	750	KCl
K 41	6.74	99.21	EY	626(er)	988	KCl
K 41	6.74	87.75	FA	631(a)	540	KCl
Rhenium						
Re 185	37.31	85.38	CP	356(a)	2,491	Re
Re 187	62.69	98.22	CP	357(a)	395	Re

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Rubidium						
Rb 85	72.27	95.97	EW	619(a)	3,058	RbCl
Rb 87	27.73	89.62	EW	620(a)	2,025	RbCl
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 147	15.12	81.63	EM	569(a)	14	Sm ₂ O ₃
Sm 147	15.12	78.35	FH	661(a)	496	Sm ₂ O ₃
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 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 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
Sm 152	26.59	89.90	EM	573(a)	3,261	Sm ₂ O ₃
Sm 152	26.59	93.92	FH	665(a)	138	Sm ₂ O ₃
Sm 154	22.62	92.10	EM	574(a)	2,528	Sm ₂ O ₃
Sm 154	22.62	96.05	FH	666(a)	430	Sm ₂ O ₃
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	70.84	12.08	DY	513(a)	143	Se

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Selenium						
Se 74	0.84	18.02	FG	654(a)	90	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
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)	89	Se
Se 76	9.15	74.20	FG	655(a)	374	Se
Se 76	9.15	88.51	FG	655(b)	148	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)	107	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)	25	Se
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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Selenium (Cont'd)						
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
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)	1,456	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)	109	Se
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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Silicon (Cont'd)						
Si 28	92.17	**	GC	761(a)		
Si 29	4.71	68.62	EB	525(a)	90	SiO ₂
Si 29	4.71	**	GC	762(a)		
Si 30	3.12	63.9	AI-AJ	105-108(a)	100	SiO ₂
Si 30	3.12	49.6	BW	282(a)	550	SiO ₂
Si 30	3.12	64.04	EB	526(a)	48	SiO ₂
Si 30	3.12	**	GC	763(a)		
Silver						
Ag 107	51.86	98.96	N	41(a)	39	AgCl
Ag 107	51.86	90.26	S-U	41(b)	115	AgCl
Ag 107	51.86	90.26	S-U	41(br)	2,143	Ag
Ag 107	51.86	96.10	EA	522(a)	1,630	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)	1,736	AgCl
Strontium						
Sr 84	0.56	63.68	EH	548(a)	0	
Sr 84	0.56	45.95	FL	679(a)	195	SrCO ₃
Sr 86	9.86	69.9	Z	78(ar)	290	SrO
Sr 86	9.86	89.02	EH	549(a)	23	Sr(NO ₃) ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Strontium (Cont'd)						
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
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)		
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)		
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)	1,099	CdS
S 34	4.29	**	GB	759(a)		
S 36	0.02	0.88	ES	599(a)	24	CdS
S 36	0.02	**	GB	760(a)		

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tellurium						
Te 120	0.094	22.3	DX	505(a)	0	
Te 120	0.094	19.90	FE	640(a)	12	Te
Te 122	2.46	77.8	AU	154(a)	19	Te
Te 122	2.46	86.24	DX	506(a)	140	Te
Te 122	2.46	81.72	FE	641(a)	240	Te
Te 123	0.86	34.9	AU	155(a)	7	Te
Te 123	0.86	60.91	DX	507(a)	67	Te
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)	198	Te
Te 124	4.67	21.8	CA	295(b)	225	Te
Te 124	4.67	76.47	DX	508(a)	555	Te
Te 124	4.67	81.34	FE	643(a)	650	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	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

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tellurium (Cont'd)						
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
Te 130	34.44	93.0	AU	160(a)	630	Te
Te 130	34.44	97.4	CA	299(a)	7,905	Te
Te 130	34.44	93.5	CA	299(br)	950	Te
Te 130	34.44	78.23	DX	512(a)	4,936	Te
Te 130	34.44	97.78	FE	647(a)	4,412	Te
Thallium						
Tl 203	29.51	75.6	BV-3	278(a)	119	Tl ₂ O ₃
Tl 203	29.51	47.9	BY-3	286(a)	4,838	Tl ₂ O ₃
Tl 203	29.51	58.8	CC-3	307(a)	404	Tl ₂ O ₃
Tl 203	29.51	86.0	CF-3	322(a)	416	Tl ₂ O ₃
Tl 203	29.51	34.1	CG-3	324(a)	83	Tl ₂ O ₃
Tl 205	70.49	89.5	BR-3	267(a)	1,261	Tl ₂ O ₃
Tl 205	70.49	95.2	BV-3	279(a)	919	Tl ₂ O ₃
Tl 205	70.49	98.7	BX	285(a)	229	Tl ₂ O ₃
Tl 205	70.49	86.1	CC-3	308(a)	444	Tl ₂ O ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Thallium (Cont'd)						
Tl 205	70.49	95.6	CF-3	323(a)	107	Tl ₂ O ₃
Tl 205	70.49	91.8	CH-3	327(a)	1,615	Tl ₂ O ₃
Tl 205	70.49	90.5	CJ-3	333(a)	1,715	Tl ₂ O ₃
Tin						
Sn 112	1.00	72.49	EC	527(au)	84	Sn
Sn 112	1.00	58.88	FS	710(a)	187	SnO ₂
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
Sn 115	0.44	17.64	FS	712(a)	63	SnO ₂
Sn 115	0.44	**	FS	712(b)		
Sn 116	14.40	74.5	AY	176(a)	116	SnO ₂
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)	7,284	SnO ₂
Sn 116	14.40	90.89	FS	713(a)	4,425	SnO ₂
Sn 116	14.40	**	FS	713(b)		
Sn 117	7.68	75.3	BI	231(b)	288	SnO ₂
Sn 117	7.68	73.93	CR	364(a)	4,748	SnO ₂
Sn 117	7.68	77.07	EC	531(a)	4,482	SnO ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tin (Cont'd)						
Sn 117	7.68	61.83	FS	714(a)	2,607	SnO ₂
Sn 117	7.68	**	FS	714(b)		
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	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
Sn 118	24.07	95.86	FS	715(a)	11,804	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	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)	18,057	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	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)	17,976	SnO ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tin (Cont'd)						
Sn 117	7.68	61.83	FS	714(a)	2,607	SnO ₂
Sn 117	7.68	**	FS	714(b)		
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	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
Sn 118	24.07	95.86	FS	715(a)	11,804	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	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)	18,057	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	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)	17,976	SnO ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tin (Cont'd)						
Sn 120	32.53	98.21	FS	717(a)	16,592	SnO ₂
Sn 120	32.53	**	FS	717(b)		
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)	2,235	SnO ₂
Sn 122	4.68	88.92	EC	535(au)	241	Sn
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)	40	SnO ₂
Sn 124	5.89	95.04	EC	536(as)	1,459	Sn
Sn 124	5.89	90.26	FS	719(a)	526	SnO ₂
Sn 124	5.89	**	FS	719(b)		
Titanium						
Ti 46	7.97	84.26	BF	215(ar)	83	TiO ₂
Ti 46	7.97	82.68	EN	576(a)	309	TiO ₂
Ti 46	7.97	**	GA	752(a)		
Ti 47	7.41	82.05	BF	216(a)	28	TiO ₂
Ti 47	7.41	82.05	BF	216(ar)	99	TiO ₂
Ti 47	7.41	63.11	EN	577(a)	444	TiO ₂
Ti 47	7.41	**	GA	753(a)		

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Titanium (Cont'd)						
Ti 48	73.50	99.23	BF	217(a)	50	TiO ₂
Ti 48	73.50	98.90	EN	578(a)	14,906	TiO ₂
Ti 48	73.50	**	GA	754(a)		
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)		
Ti 50	5.48	84.69	BF	219(a)	0	
Ti 50	5.48	81.44	EN	580(a)	139	TiO ₂
Ti 50	5.48	**	GA	756(a)		
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)	175	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)	10,990	WO ₃
W 183	14.33	86.21	BG	222(a)	217	WO ₃
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)	390	WO ₃
W 184	30.61	91.14	CL	343(a)	106	WO ₃

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Tungsten (Cont'd)						
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)	616	WO ₃
W 186	28.69	97.17	CL	344(ar)	372	WO ₃
W 186	28.69	97.54	EL	565(a)	10,367	WO ₃
Vanadium						
V 50	0.28	22.83	FM	683(b)	36	V ₂ O ₅
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
Zinc						
Zn 64	49.18	83.8	AG	97(a)	394	ZnO
Zn 64	49.18	93.12	EK	556(a)	7,472	ZnO
Zn 66	27.76	78.4	AH	100(a)	712	ZnO
Zn 66	27.76	93.79	EK	557(a)	7,700	ZnO
Zn 67	4.05	56.0	BK	242(a)	102	ZnO
Zn 67	4.05	60.46	EK	558(a)	946	ZnO
Zn 68	18.40	95.47	EK	559(a)	6,287	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)	151	ZnO

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
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)	11,815	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
Zr 91	11.21	86.6	CK	335(a)	33	ZrO ₂
Zr 91	11.21	86.6	CK	335(ar)	1,837	ZrO ₂
Zr 91	11.21	75.1	CV	382(a)	839	ZrO ₂
Zr 92	17.18	92.7	CK	336(a)	381	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)	5,168	ZrO ₂
Zr 96	2.99	74.6	CK	338(a)	27	ZrO ₂

* - Analysis Incomplete

** - Refinement Incomplete

ELECTROMAGNETICALLY CONCENTRATED ISOTOPES

Element and Isotope	ISOTOPIC ABUNDANCE (atom percent)		Series	Sample	AVAILABLE FOR SHIPMENT	
	Natural	Enriched			Element Weight (milligrams)	Product Form
Zirconium						
Zr 96	2.99	74.6	CK	388(ar)	0	
Zr 96	2.99	89.48	EE	543(a)	0	

* - Analysis Incomplete
** - Refinement Incomplete