

Isotope	abundance in nature %	Z	N	A from web	binding energy	concentration in ppm/% in morb	proton factor	neutron factor	concentration in ppm in crust	Element	mantle ppm/%	Element	crust ppm
si28	92	14	14	27.97	242.989838064	21.9144	14.10955	14.121308656		Si	23.82		
si29	4.68	14	15	28.97	251.06119614	1.114776	14.10955	15.12997356		Ti	1.1		
si30	3.08	14	16	29.97	259.132554215999	0.733656	14.10955	16.138638464		Al	7.77		
ti46	8.25	22	24	45.95	400.645318823994	0.09075	22.17215	24.207957696		Fe	7.88		
ti47	7.44	22	25	46.95	408.716676899993	0.08184	22.17215	25.2166226		Mg	4.82		
ti48	73.72	22	26	47.94	426.103034975998	0.81092	22.17215	26.225287504		Ca	8.15		
ti49	5.41	22	27	48.94	434.174393051998	0.05951	22.17215	27.233952408		Na	2.15		
ti50	5.18	22	28	49.94	442.245751127997	0.05698	22.17215	28.242617312		K	0.14		
al26			**				0	0		U	0.233	U	0.0098 0.2232
al27	99.9	13	14	26.98	226.385850563998	7.76223	13.101725	14.121308656		Rb	2.98	Rb	0.174 2.806
fe54	5.84	26	28	53.93	480.716701127997	0.460192	26.20345	28.242617312		K	1375	K	125 1250
fe56	91.7	26	30	55.93	496.859417279997	7.22596	26.20345	30.25994712		Th	0.363	Th	0.038 0.325
fe57	2.19	26	31	56.93	504.930775559997	0.172572	26.20345	31.268612024		Pb	0.662	Pb	0.057 0.605
fe58	0.28	26	32	57.93	513.002133431996	0.022064	26.20345	32.277276928		Ba	14.4	Ba	3.75 10.65
mg24	79	12	12	23.98	202.954146912001	3.8078	12.0939	12.103978848		Sr	115	Sr	17.6 97.4
mg25	10	12	13	24.98	211.025504988001	0.482	12.0939	13.112643752		La	4.09	La	0.519 3.571
mg26	11	12	14	25.98	219.096863064001	0.5302	12.0939	14.121308656		Ce	12.8	Ce	1.38 11.42
ca40	96.9	20	20	39.96	344.466911520002	7.89735	20.1565	20.17329808		Nd	10.8	Nd	1.11 9.69
ca42			**				0	0		Sm	3.67	Sm	0.38 3.29
ca43			**				0	0		Eu	1.35	Eu	0.146 1.204
ca44			**				0	0		Gd	4.73	Gd	0.521 4.209
ca46			**				0	0		Dy	5.18	Dy	0.653 4.527
ca48			**				0	0		Y	32.6	Y	4.19 28.41
na23	100	11	12	22.98	195.665159411998	2.15	11.086075	12.103978848		Er	4.14	Er	0.425 3.715
k39	93.3	19	20	38.96	337.177924019999	0.13062	19.148675	20.17329808		Yb	3.14	Yb	0.429 2.711
k40	0.01	19	21	39.96	345.249282095998	0.000014	19.148675	21.181962984		Lu	3.13	Lu	0.065 3.065
k41	6.7	19	22	40.96	353.320640171998	0.00938	19.148675	22.190627888		P	860	P	84.2 775.8
u238	99.27	92	146	238.05	1802.43012909598	0.2312991	92.7199	147.265075984	0.00972846	Zr	119	Zr	9.63 109.37
u234	0.71	92	142	234.05	1770.14469679198	0.0016543	92.7199	143.230416368	0.00006958	Hf	2.88	Hf	0.258 2.622
u235	**	92	143	235.05	1778.21605486798		92.7199	144.239081272		Ta	0.277	Ta	0.029 0.248
rb85	72.2	37	48	84.91	740.952725148003	2.15156	37.289525	48.415915392	0.125628	Nb	6.98	Nb	0.573 6.407
rb87	27.8	37	50	86.9	766.410441299994	0.82844	37.289525	50.4332452	0.048372	Co	43.8	Co	106 -62.2
th232	100	90	232	232	86363.563948632	0.363	90.70425	234.010257728	0.038	Cr	255	Cr	2644 -2389
pb204	1.4	82	122	203.97	1610.347660272	0.009268	82.64165	123.057118288	0.000798	Cu	66.8	Cu	30 36.8
pb206	24.1	82	124	205.97	1626.490376424	0.159542	82.64165	125.07448096	0.013737	Ni	77.4	Ni	1974 -1896.6
pb207	2.1	82	125	206.97	1634.5617345	0.013902	82.64165	126.083113	0.001197	Sc	41.4	Sc	16.2 25.2
pb208	52.4	82	126	207.97	1642.633092576	0.346888	82.64165	127.091777904	0.029868	Zn	89.7	Zn	54.9 34.8
ba138	71.7	56	82	137.9	1163.18466223197	10.3248	56.4382	82.710522128	2.68875				
university age	28.3	**		131			0	0					
sr84	0.56	38	46	83.91	732.098996496001	0.644	38.29735	46.398585584	0.09856				
sr86	9.86	38	48	85.9	757.556712648005	11.339	38.29735	48.415915392	1.73536				
sr87	7	38	49	86.9	765.628070724005	8.05	38.29735	49.424580296	1.232				
sr88	82.58	38	50	87.9	773.699428800004	94.967	38.29735	50.4332452	14.53408				
la139	99.91	57	82	138.9	1170.47364973199	4.086319	57.446025	82.710522128	0.5185329				
ce140	88.5	**		139.9			0	0					
ce142	11	58	84	141.9	1193.90535338399	1.408	58.45385	84.727851936	0.1518				
ce138	0.25	58	80	137.9	1161.61992107999	0.032	58.45385	80.69319232	0.00345				
ce136	0.2	58	82	135.9	4903.76263723199	0.0256	58.45385	82.710522128	0.00276				
nb93	100	41	51	92.9	-127.86225062401	6.98	41.320825	51.441910104	0.573				
sm152	26.72	62	90	151.91	1262.17445183999	0.980624	62.48515	90.77984136	0.101536				
sm144	3.07	62	82	143.91	1197.60358723199	0.112669	62.48515	82.710522128	0.011666				
sm147	14.99	62	85	146.91	1221.81766145999	0.550133	62.48515	85.73651684	0.056962				
sm148	11.24	62	86	147.91	1229.88901953599	0.412508	62.48515	86.745181744	0.042712				
sm149	13.82	62	87	148.91	1237.96037761199	0.507194	62.48515	87.753846648	0.052516				
sm150	7.38	62	88	149.91	1246.03173568799	0.270846	62.48515	88.762511552	0.028044				
eu151	47.81	63	88	150.91	1253.32072318798	0.645435	63.492975	88.762511552	0.0698026				
eu153	52.19	63	90	152.91	1269.46343933998	0.704565	63.492975	90.77984136	0.0761974				
gd154	2.18	64	90	153.92	1267.43742684002	0.103114	64.5008	90.77984136	0.0113578				
gd155	14.8	64	91	154.92	1275.50878491602	0.70004	64.5008	91.788506264	0.077108				
gd156	20.47	64	92	155.92	1283.58014299201	0.968231	64.5008	92.797171168	0.1066487				
gd157	40.8	64	93	156.92	1291.65150106801	1.92984	64.5008	93.805836072	0.212568				
gd160	21.86	64	96	159.92	1315.86557529601	1.033978	64.5008	96.831830784	0.1138906				
dy	sint	**					0	0					
y89	99.9	39	50	89.9	-150.5115837	32.5674	39.305175	50.4332452	4.18581				
er162	0.14	68	94	161.92	1328.878809144	0.005796	68.5321	94.814500976	0.000595				
er164	1.61	68	96	163.92	1345.021525296	0.066654	68.5321	96.831830784	0.0068425				
er166	33.5	68	98	165.93	1351.84924144798	1.3869	68.5321	98.849160592	0.142375				
er167	22.93	68	99	166.93	1359.92059952398	0.949302	68.5321	99.857825496	0.0974525				
er168	26.78	68	100	167.93	1367.99195759998	1.266694	68.5321	100.8664904	0.1395238				
er170	14.93	68	101	169.93	144.563315675983	0.618102	68.5321	101.875155304	0.0634525				
yb168	0.13	70	100	167.93	3245.56993259998	0.004082	70.54775	100.8664904	0.0005577				
yb170	3.04	70	101	169.93	2322.14129067598	0.095456	70.54775	101.875155304	0.0130416				
yb171	14.28	70	101	170.93	1390.64129067598	0.448392	70.54775	101.875155304	0.0612612				
yb172	21.83	70	102	171.93	1398.71264875198	0.685462	70.54775	102.883820208	0.0936507				
yb173	16.13	70	103	172.93	1406.78400682798	0.506482	70.54775	103.892485112	0.0691977				
yb174	31.8	70	104	173.93	1414.85536490398	0.99852	70.54775	104.901150016	0.136422				
yb176	12.76	70	106	175.94	1421.68308105598	0.400664	70.54775	106.918479824	0.0547404				
lu175	97.41	71	104	174.94	1412.82935240401	3.048933	71.555575	104.901150016	0.0633165				
p31	100	15	16	30.97	266.421541716	860	15.117375	16.138638464	84.2				
zr96	2.8	40	56	95.9	836.70552255997	3.332	40.313	56.485234624	0.26964				
zr90	51.45	40	50	89.9	788.277403799999	61.2255	40.313	50.4332452	4.954635				
zr91	11.22	40	51	90.9	796.348761875998	13.3518	40.313	51.441910104	1.080486				
zr92	17.15	40	52	91.9	804.420119951998	20.4085	40.313	52.450575008	1.651545				
zr94	17.38	40	54	93.9	820.562836103998	20.6822	40.313	54.467904816	1.673694				
hf176	5.26	72	102	175.94	-459.02437624799	0.151488	72.5634	102.883820208	0.0135708				
hf177	18.6	72	105	176.94	1428.18969798001	0.53568	72.5634	105.90981492	0.047988				
hf178	27.28	72	106	177.94	1436.26105605601	0.785664	72.5634	106.918479824	0.0703824				
hf179	13.62	72	107	178.94	1444.33241413201	0.392256	72.5634	107.927144728	0.0351396				
hf180	35.08	72	108	179.94	1452.403772208	1.010304	72.5634	108.935809632	0.0905064				
ta181	99.98	73	108										

Element	mantle ppm/%	Element	crust ppm			
SiO2	51.04					
TiO2	1.84			Oxide values will be reformed to show non-onygen element abundance only		
Al2O3	14.69					
FeOT	10.14					
MgO	8					
CaO	11.41					
Na2O	2.91			B-D jurr for comparison		
K2O	0.17					
U	0.233	U	0.0098		0.2232	
Rb	2.98	Rb	0.174		2.806	
K	1375	K	125		1250	
Th	0.363	Th	0.038		0.325	
Pb	0.662	Pb	0.057		0.605	
Ba	14.4	Ba	3.75		10.65	
Sr	115	Sr	17.6		97.4	
La	4.09	La	0.519		3.571	
Ce	12.8	Ce	1.38		11.42	
Nd	10.8	Nd	1.11		9.69	
Sm	3.67	Sm	0.38		3.29	
Eu	1.35	Eu	0.146		1.204	
Gd	4.73	Gd	0.521		4.209	
Dy	5.18	Dy	0.653		4.527	
Y	32.6	Y	4.19		28.41	
Er	4.14	Er	0.425		3.715	
Yb	3.14	Yb	0.429		2.711	
Lu	3.13	Lu	0.065		3.065	
P	860	P	84.2		775.8	
Zr	119	Zr	9.63		109.37	
Hf	2.88	Hf	0.258		2.622	
Ta	0.277	Ta	0.029		0.248	
Nb	6.98	Nb	0.573		6.407	
Co	43.8	Co	106		-62.2	
Cr	255	Cr	2644		-2389	
Cu	66.8	Cu	30		36.8	
Ni	77.4	Ni	1974		-1896.6	
Sc	41.4	Sc	16.2		25.2	
Zn	89.7	Zn	54.9		34.8	