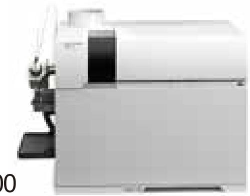
Agilent 7900

Agilent ICP-MS



Agilent 7800

Agilent 8900 ICP-QQQ

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	1 1.008 H hydrogen 13.60 -259 -253																	2 4.003 He helium 24.59 54.42 -269	1
2	3 6.94 Li lithium 5.39 181 75.64 1342	4 9.012 Be beryllium 9.32 1287 18.21 2468											5 10.81 B boron 8.30 2077 25.15 4000	6 12.01 C carbon 11.26 3825 24.38 3825	7 14.01 N nitrogen 14.53 -210 29.60 -196	8 16.00 O oxygen 13.62 -219 35.12 -183	9 19.00 F fluorine 17.42 -220 34.97 -188	10 20.18 Ne neon 21.56 -249 40.96 -246	2
3	11 22.99 Na sodium 5.14 98 47.29 883	12 24.31 Mg magnesium 7.65 650 15.04 1090											13 26.98 Al aluminium 5.99 660 18.83 2519	14 28.09 Si silicon 8.15 1414 16.35 3265	15 30.97 P phosphorus 10.49 44 19.77 281	16 32.06 S sulfur 10.36 115 23.34 445	17 35.45 Cl chlorine 12.97 -102 23.81 - 34	18 39.95 Ar argon 15.76 -189 27.63 -186	3
4	19 39.10 K potassium 4.34 64 31.63 759	20 40.08 Ca calcium 6.11 842 11.87 1484	21 44.96 Sc scandium 6.56 1541 12.80 2836	22 47.87 Ti titanium 6.83 1670 13.58 3287	23 50.94 V vanadium 6.75 1910 14.62 3407	24 52.00 Cr chromium 6.77 1907 16.49 2671	25 54.94 Mn manganese 7.43 1246 15.64 2061	26 55.85 Fe iron 7.90 1538 16.19 2861	27 58.93 Co cobalt 7.88 1495 17.08 2927	28 58.69 Ni nickel 7.64 1455 18.17 2913	29 63.55 Cu copper 7.73 1085 20.29 2560	30 65.38 Zn zinc 9.39 420 17.96 907	31 69.72 Ga gallium 6.00 30 20.52 2229	32 72.63 Ge germanium 7.90 938 15.93 2833	33 74.92 As arsenic 9.79 616 18.59 616	34 78.97 Se selenium 9.75 221 21.19 685	35 79.90 Br bromine 11.81 - 7 21.59 59	36 83.80 Kr krypton 14.00 -157 24.36 -153	4
5	37 85.47 Rb rubidium 4.18 39.3 27.29 688	38 87.62 Sr strontium 5.69 777 11.03 1377	39 88.91 Y yttrium 6.22 1522 12.22 3345	40 91.22 Zr zirconium 6.63 1854 13.1 4406	41 92.91 Nb niobium 6.76 2477 14.0 4741	42 95.95 Mo molybdenum 7.09 2622 16.16 4639	43 (98) Tc technetium 7.28 2157 15.26 4262	44 101.1 Ru ruthenium 7.36 2333 16.76 4147	45 102.9 Rh rhodium 7.46 1963 18.08 3695	46 106.4 Pd palladium 8.34 1555 19.43 2963	47 107.9 Ag silver 7.58 962 21.48 2162	48 112.4 Cd cadmium 8.99 321 16.91 767	49 114.8 In indium 5.79 157 18.87 2027	50 118.7 Sn tin 7.34 232 14.63 2586	51 121.8 Sb antimony 8.61 631 16.63 1587	52 127.6 Te tellurium 9.01 450 18.60 988	53 126.9 I iodine 10.45 114 19.13 184	54 131.3 Xe xenon 12.13 -112 20.97 -108	5
6	55 132.9 Cs caesium 3.89 28.5 23.16 671	56 137.3 Ba barium 5.21 727 10.00 1845	57-71 L Lanthanides	72 178.5 Hf hafnium 6.83 2233 15.0 4600	73 180.9 Ta tantalum 7.55 3017 5455	74 183.8 W tungsten 7.86 3414 16.10 5555	75 186.2 Re rhenium 7.83 3185 5590	76 190.2 Os osmium 8.44 3033 5008	77 192.2 Ir iridium 8.97 2446 4428	78 195.1 Pt platinum 8.96 1768 18.56 3825	79 197.0 Au gold 9.23 1064 20.2 2836	80 200.6 Hg mercury 10.44 - 39 18.76 357	81 204.4 Tl thallium 6.11 304 20.43 1473	82 207.2 Pb lead 7.42 327 15.03 1749	83 209.0 Bi bismuth 7.29 271 16.70 1564	84 (209) Po polonium 8.41 254 962	85 (210) At astatine 300 350	86 (222) Rn radon 10.75 - 71 - 62	6
7	87 (223) Fr francium 4.07 21 650	88 (226) Ra radium 5.28 696 10.15 1500	89-103 A Actinides	104 (267) Rf rutherfordium 6.0	105 (268) Db dubnium	106 (271) Sg seaborgium	107 (272) Bh bohrium	108 (270) Hs hassium	109 (276) Mt meitnerium	110 (281) Ds darmstadtium	111 (280) Rg roentgenium	112 (285) Cn copernicium	113 (284) Uut ununtrium	114 (289) Fl flerovium	115 (288) Uup ununpentium	116 (293) Lv livermorium	117 (294) Uus ununseptium	118 (294) Uuo ununoctium	7

L Lanthanides	57 138.9 La lanthanum 5.58 920 11.06 3464	58 140.1 Ce cerium 5.54 799 10.85 3443	59 140.9 Pr praseodymium 5.47 931 10.55 3520	60 144.2 Nd neodymium 5.53 1016 10.72 3074	61 (145) Pm promethium 5.58 1042 10.90 3000	62 150.4 Sm samarium 5.64 1072 11.07 1794	63 152.0 Eu europium 5.67 822 11.25 1529	64 157.3 Gd gadolinium 6.15 1313 12.09 3273	65 158.9 Tb terbium 5.86 1359 11.52 3230	66 162.5 Dy dysprosium 5.94 1412 11.67 2567	67 164.9 Ho holmium 6.02 1472 11.80 2700	68 167.3 Er erbium 6.11 1529 11.93 2868	69 168.9 Tm thulium 6.18 1545 12.05 1950	70 173.1 Yb ytterbium 6.25 824 12.18 1196	71 175.0 Lu lutetium 5.43 1663 13.90 3402
A Actinides	89 (227) Ac actinium 5.17 1050 11.75 3200	90 232.0 Th thorium 6.31 1750 11.90 4785	91 231.0 Pa protactinium 5.89 1572 4000	92 238.0 U uranium 6.19 1135 10.60 4131	93 (237) Np neptunium 6.27 644 3902	94 (244) Pu plutonium 6.03 640 11.20 3228	95 (243) Am americium 5.97 1176 2011	96 (247) Cm curium 5.99 1345	97 (247) Bk berkelium 6.20 986	98 (251) Cf californium 6.28 900 11.80	99 (252) Es einsteinium 6.42 860 12.0	100 (257) Fm fermium 6.50 1527	101 (258) Md mendelevium 6.58 827	102 (259) No nobelium 6.65 827	103 (262) Lr lawrencium 4.90 1627

atomic number	atomic weight
Element Symbol	
(eV) first ionization potential	(°C)/1 atm melting point
second ionization potential	boiling point

: synthetic

Agilent Technologies

www.agilent.com/chem/icpms

Relative Isotopic Abundance Table

(unit: %)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
H	99.99	0.01														
He				100												
Li						7.59	**92.41**									
Be									**100**							
B										19.9	**80.1**					
C												98.93	1.07			
N														99.64	0.36	
O																99.76

	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
O	0.04	0.2														
F			100													
Ne				90.48	0.27	9.25										
Na							**100**									
Mg								**78.99**	10.00	11.01						
Al											**100**					
Si												**92.22**	4.69	3.09		
P															**100**	
S																94.99

	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
S	0.75	**4.25**		0.01												
Cl			**75.76**		24.24											
Ar				0.34		0.06		99.60								
K							**93.26**	0.01	6.73							
Ca								96.941		0.647	**0.135**	**2.086**		0.004		0.187
Sc													**100**			
Ti														8.25	**7.44**	73.72

	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64
Ti	5.41	5.18														
V		0.25	**99.75**													
Cr		4.345		**83.79**	9.50	2.365										
Mn							**100**									
Fe						5.85		**91.75**	2.12	0.28						
Co											**100**					
Ni										68.08		**26.22**	1.14	3.63		0.93
Cu															**69.15**	
Zn																49.17

	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
Cu	30.85															
Zn		**27.73**	4.04	18.45		0.61										
Ga					60.11		**39.89**									
Ge						20.57		**27.45**	7.75	36.50		7.73				
As											**100**					
Se										0.89		9.37	7.63	**23.77**		49.61
Br															**50.69**	
Kr														0.35		2.29

	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96
Se		8.73														
Br	49.31															
Kr		11.59	11.50	56.99		17.28										
Rb					**72.17**		27.83									
Sr				0.56		9.86	7.00	**82.58**								
Y									**100**							
Zr										**51.45**	11.22	17.15		17.38		2.80
Nb													**100**			
Mo												14.53		9.15	**15.84**	16.67
Ru																5.54

Yellow : recommended mass number (He mode)

	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111	112
Mo	9.60	24.39		9.82												
Ru		1.87	12.76	12.60	**17.06**	31.55		18.62								
Rh							**100**									
Pd						1.02		11.14	**22.33**	27.33		26.46		11.72		
Ag											**51.84**		48.16			
Cd										1.25		0.89		12.49	**12.80**	24.13
Sn																0.97

	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127	128
Cd	12.22	28.73		7.49												
In	4.29		**95.71**													
Sn		0.66	0.34	14.54	7.68	**24.22**	8.59	32.58		4.63		5.79				
Sb									**57.21**		42.79					
Te								0.09		2.55	0.89	4.74	**7.07**	18.84		31.74
I															**100**	
Xe												0.09		0.09		1.91

	129	130	131	132	133	134	135	136	137	138	139	140	141	142	143	144
Te		34.08														
Xe	26.40	4.07	21.23	26.91		10.44		8.86								
Cs					**100**											
Ba		0.11		0.10		2.42	6.59	7.85	**11.23**	71.70						
La										0.09	**99.91**					
Ce								0.19		0.25		**88.45**		11.11		
Pr													**100**			
Nd														27.2	12.2	23.8
Sm																3.07

	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
Nd	8.3	**17.2**		5.7		5.6										
Sm			**14.99**	11.24	13.82	7.38		26.75		22.75						
Eu							47.81		**52.19**							
Gd								0.20		2.18	14.80	20.47	**15.65**	24.84		21.86
Tb															**100**	
Dy												0.06		0.09		2.33

	161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176
Dy	18.89	25.47	**24.90**	28.26												
Ho					**100**											
Er		0.14		1.60		**33.50**	22.87	26.98		14.91						
Tm									**100**							
Yb								0.12		2.98	14.09	**21.68**	16.10	32.03		13.00
Lu															**97.40**	2.60
Hf														0.16		5.26

	177	178	179	180	181	182	183	184	185	186	187	188	189	190	191	192
Hf	18.60	**27.28**	13.62	35.08												
Ta				0.01	**99.99**											
W				0.12		**26.50**	14.31	30.64		28.43						
Re									**37.40**		62.60					
Os								0.02		1.59	1.96	13.24	**16.15**	26.26		40.78
Ir															37.3	
Pt														0.012		0.782

	193	194	195	196	197	198	199	200	201	202	203	204	205	206	207	208
Ir	**62.7**															
Pt		32.86	**33.78**	25.21		7.356										
Au					**100**											
Hg				0.15		9.97	16.87	23.10	**13.18**	**29.86**		6.87				
Tl											29.52		**70.48**			
Pb												1.4		24.1	22.1	**52.4**

	209	210	211	212	213	214	215	216	217	218	219	220	221	222	223	224
Bi	**100**															

	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
Th								**100**								
U										0.005	0.720			**99.274**		

Printed in Japan
G8400-90001

Agilent Technologies