

Atomic Masses (amu)																		
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VII B</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H 1.008																	2 He 4.003
	3 Li 6.941	4 Be 9.012											5 B 10.81	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
3	11 Na 22.99	12 Mg 24.31											13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.95
4	19 K 39.10	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.55	30 Zn 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.92	34 Se 78.96	35 Br 79.90	36 Kr 83.80
5	37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.22	41 Nb 92.91	42 Mo 95.94	43 Tc 97.91	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.76	52 Te 127.60	53 I 126.90	54 Xe 131.29
6	55 Cs 132.91	56 Ba 137.33	57 La 138.91	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.21	83 Bi 208.98	84 Po 208.98	85 At 209.99	86 Rn 222.02
7	87 Fr 223.02	88 Ra 226.03	89 Ac 227.03	104 Rf 261.11	105 Db 262.11	106 Sg 266.12	107 Bh 264.12	108 Hs 269.13	109 Mt 268.24	110 Ds 271	111 Rg 272	112 Cn 275						

6	58 Ce 140.12	59 Pr 140.91	60 Nd 144.24	61 Pm 144.91	62 Sm 150.36	63 Eu 151.96	64 Gd 157.25	65 Tb 158.93	66 Dy 162.50	67 Ho 164.93	68 Er 167.26	69 Tm 168.93	70 Yb 173.04	71 Lu 174.97
7	90 Th 232.04	91 Pa 231.04	92 U 238.03	93 Np 237.05	94 Pu 244.06	95 Am 243.06	96 Cm 247.07	97 Bk 247.07	98 Cf 251.08	99 Es 252.08	100 Fm 257.10	101 Md 258.10	102 No 259.10	103 Lr 262.11

Element Names																				
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1	1 H hydrogen																		2 He helium	
	3 Li lithium	4 Be beryllium											5 B boron	6 C carbon	7 N nitrogen	8 O oxygen	9 F fluorine	10 Ne neon		
2																				
3	11 Na sodium	12 Mg magnesium											13 Al aluminum	14 Si silicon	15 P phosphorus	16 S sulfur	17 Cl chlorine	18 Ar argon		
4	19 K potassium	20 Ca calcium	21 Sc scandium	22 Ti titanium	23 V vanadium	24 Cr chromium	25 Mn manganese	26 Fe iron	27 Co cobalt	28 Ni nickel	29 Cu copper	30 Zn zinc	31 Ga gallium	32 Ge germanium	33 As arsenic	34 Se selenium	35 Br bromine	36 Kr krypton		
5	37 Rb rubidium	38 Sr strontium	39 Y yttrium	40 Zr zirconium	41 Nb niobium	42 Mo molybdenum	43 Tc technetium	44 Ru ruthenium	45 Rh rhodium	46 Pd palladium	47 Ag silver	48 Cd cadmium	49 In indium	50 Sn tin	51 Sb antimony	52 Te tellurium	53 I iodine	54 Xe xenon		
6	55 Cs cesium	56 Ba barium	57 La lanthanum	72 Hf hafnium	73 Ta tantalum	74 W tungsten	75 Re rhenium	76 Os osmium	77 Ir iridium	78 Pt platinum	79 Au gold	80 Hg mercury	81 Tl thallium	82 Pb lead	83 Bi bismuth	84 Po polonium	85 At astatine	86 Rn radon		
7	87 Fr francium	88 Ra radium	89 Ac actinium	104 Rf rutherfordium	105 Db dubnium	106 Sg seaborgium	107 Bh bohrium	108 Hs hassium	109 Mt meitnerium	110 Ds darmstadtium	111 Rg roentgenium	112 Cn copernicium								

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58 Ce cerium	59 Pr praseodymium	60 Nd neodymium	61 Pm promethium	62 Sm samarium	63 Eu europium	64 Gd gadolinium	65 Tb terbium	66 Dy dysprosium	67 Ho holmium	68 Er erbium	69 Tm thulium	70 Yb ytterbium	71 Lu lutetium
90 Th thorium	91 Pa protactinium	92 U uranium	93 Np neptunium	94 Pu plutonium	95 Am americium	96 Cm curium	97 Bk berkelium	98 Cf californium	99 Es einsteinium	100 Fm fermium	101 Md mendelevium	102 No nobelium	103 Lr lawrencium

Classification of the Elements

	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H non-metal																	2 He non-metal
2	3 Li metallic	4 Be metallic											5 B metalloid	6 C non-metal	7 N non-metal	8 O non-metal	9 F non-metal	10 Ne non-metal
3	11 Na metallic	12 Mg metallic											13 Al metallic	14 Si metalloid	15 P non-metal	16 S non-metal	17 Cl non-metal	18 Ar non-metal
4	19 K metallic	20 Ca metallic	21 Sc metallic	22 Ti metallic	23 V metallic	24 Cr metallic	25 Mn metallic	26 Fe metallic	27 Co metallic	28 Ni metallic	29 Cu metallic	30 Zn metallic	31 Ga metallic	32 Ge metalloid	33 As metalloid	34 Se non-metal	35 Br non-metal	36 Kr non-metal
5	37 Rb metallic	38 Sr metallic	39 Y metallic	40 Zr metallic	41 Nb metallic	42 Mo metallic	43 Tc metallic	44 Ru metallic	45 Rh metallic	46 Pd metallic	47 Ag metallic	48 Cd metallic	49 In metallic	50 Sn metallic	51 Sb metalloid	52 Te metalloid	53 I non-metal	54 Xe non-metal
6	55 Cs metallic	56 Ba metallic	57 La metallic	72 Hf metallic	73 Ta metallic	74 W metallic	75 Re metallic	76 Os metallic	77 Ir metallic	78 Pt metallic	79 Au metallic	80 Hg metallic	81 Tl metallic	82 Pb metallic	83 Bi metallic	84 Po metallic	85 At non-metal	86 Rn non-metal
7	87 Fr metallic	88 Ra metallic	89 Ac metallic	104 Rf metallic	105 Db metallic	106 Sg metallic	107 Bh metallic	108 Hs metallic	109 Mt metallic	110 Ds metallic	111 Rg metallic	112 Cn metallic						

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58 Ce metallic	59 Pr metallic	60 Nd metallic	61 Pm metallic	62 Sm metallic	63 Eu metallic	64 Gd metallic	65 Tb metallic	66 Dy metallic	67 Ho metallic	68 Er metallic	69 Tm metallic	70 Yb metallic	71 Lu metallic
90 Th metallic	91 Pa metallic	92 U metallic	93 Np metallic	94 Pu metallic	95 Am metallic	96 Cm metallic	97 Bk metallic	98 Cf metallic	99 Es metallic	100 Fm metallic	101 Md metallic	102 No metallic	103 Lr metallic

		Group (Family) Names																		
		<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VII B</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	1 H																			2 He
2	3 Li	4 Be											5 B	6 C	7 N	8 O	9 F	10 Ne		
3	11 Na	12 Mg											13 Al	14 Si	15 P	16 S	17 Cl	18 Ar		
4	19 K	20 Ca	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga	32 Ge	33 As	34 Se	35 Br	36 Kr		
5	37 Rb	38 Sr	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In	50 Sn	51 Sb	52 Te	53 I	54 Xe		
6	55 Cs	56 Ba	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl	82 Pb	83 Bi	84 Po	85 At	86 Rn		
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn	group 13: boron family	group 14: carbon family	group 15: nitrogen (pnictogen) family	group 16: oxygen (chalcogen) family	group 17: halogen family	group 18: noble gas family		
	group 1: alkali metals (except H)	group 2: alkaline earth metals	groups 3-12: outer transition metals																	
	lanthanoid and actinoid series: inner transition metals																			
	6			58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu			
	7			90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr			

Electronegativity (Pauling)																		
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H 2.20																	2 He
2	3 Li 0.98	4 Be 1.57											5 B 2.04	6 C 2.55	7 N 3.04	8 O 3.44	9 F 3.98	10 Ne
3	11 Na 0.93	12 Mg 1.31											13 Al 1.61	14 Si 1.90	15 P 2.19	16 S 2.58	17 Cl 3.16	18 Ar
4	19 K 0.82	20 Ca 1.00	21 Sc 1.36	22 Ti 1.54	23 V 1.63	24 Cr 1.66	25 Mn 1.55	26 Fe 1.83	27 Co 1.88	28 Ni 1.91	29 Cu 1.90	30 Zn 1.65	31 Ga 1.81	32 Ge 2.01	33 As 2.18	34 Se 2.55	35 Br 2.96	36 Kr 3.00
5	37 Rb 0.82	38 Sr 0.95	39 Y 1.22	40 Zr 1.33	41 Nb 1.60	42 Mo 2.16	43 Tc 2.10	44 Ru 2.20	45 Rh 2.28	46 Pd 2.20	47 Ag 1.93	48 Cd 1.69	49 In 1.78	50 Sn 1.96	51 Sb 2.05	52 Te 2.10	53 I 2.66	54 Xe 2.60
6	55 Cs 0.79	56 Ba 0.89	57 La 1.10	72 Hf 1.30	73 Ta 1.50	74 W 1.70	75 Re 1.90	76 Os 2.20	77 Ir 2.20	78 Pt 2.28	79 Au 2.54	80 Hg 2.00	81 Tl 1.62	82 Pb 2.33	83 Bi 2.02	84 Po 2.00	85 At 2.20	86 Rn 2.20
7	87 Fr 0.70	88 Ra 0.90	89 Ac 1.10	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn						

6	58 Ce 1.12	59 Pr 1.13	60 Nd 1.14	61 Pm 1.13	62 Sm 1.17	63 Eu 1.20	64 Gd 1.20	65 Tb 1.10	66 Dy 1.22	67 Ho 1.23	68 Er 1.24	69 Tm 1.25	70 Yb 1.10	71 Lu 1.27
7	90 Th 1.30	91 Pa 1.50	92 U 1.38	93 Np 1.36	94 Pu 1.28	95 Am 1.13	96 Cm 1.28	97 Bk 1.30	98 Cf 1.30	99 Es 1.30	100 Fm 1.30	101 Md 1.30	102 No 1.30	103 Lr 1.30

Electron Affinity (kJ/mol)																		
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VII B</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H 72.77																	2 He
	3 Li 59.63	4 Be 0.00											5 B 26.99	6 C 121.78	7 N 7.00	8 O 140.98	9 F 328.16	10 Ne 0.00
3	11 Na 52.87	12 Mg 0.00											13 Al 41.76	14 Si 134.07	15 P 72.03	16 S 200.41	17 Cl 348.57	18 Ar 0.00
4	19 K 48.38	20 Ca 2.37	21 Sc	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni	29 Cu	30 Zn	31 Ga 41.52	32 Ge 118.94	33 As 78.54	34 Se 194.97	35 Br 324.54	36 Kr 0.00
5	37 Rb 46.88	38 Sr 4.63	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd	47 Ag	48 Cd	49 In 28.90	50 Sn 107.30	51 Sb 103.20	52 Te 190.20	53 I 295.15	54 Xe 0.00
6	55 Cs 45.50	56 Ba 13.95	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt	79 Au	80 Hg	81 Tl 19.20	82 Pb 35.10	83 Bi 91.20	84 Po 183.30	85 At 270.10	86 Rn 0.00
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn						

6	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
7	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

First Ionization Energy (kJ/mol)																		
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1 H 1312.0																	2 He 2372.3
2	3 Li 520.2	4 Be 899.5											5 B 800.6	6 C 1086.5	7 N 1402.3	8 O 1313.9	9 F 1681.0	10 Ne 2080.7
3	11 Na 495.8	12 Mg 737.7											13 Al 577.5	14 Si 786.5	15 P 1011.8	16 S 999.6	17 Cl 1251.2	18 Ar 1520.6
4	19 K 418.8	20 Ca 589.8	21 Sc 633.1	22 Ti 658.8	23 V 650.9	24 Cr 652.9	25 Mn 717.3	26 Fe 762.5	27 Co 760.4	28 Ni 737.1	29 Cu 745.5	30 Zn 906.4	31 Ga 578.8	32 Ge 762.2	33 As 944.5	34 Se 941.0	35 Br 1139.9	36 Kr 1350.8
5	37 Rb 403.0	38 Sr 549.5	39 Y 599.9	40 Zr 640.1	41 Nb 652.1	42 Mo 684.3	43 Tc	44 Ru 710.2	45 Rh 719.7	46 Pd 804.4	47 Ag 731.0	48 Cd 867.8	49 In 558.3	50 Sn 708.6	51 Sb 830.6	52 Te 869.3	53 I 1008.4	54 Xe 1170.3
6	55 Cs 375.7	56 Ba 502.9	57 La	72 Hf 658.5	73 Ta 728.4	74 W 758.8	75 Re 755.8	76 Os 814.2	77 Ir 865.2	78 Pt 864.4	79 Au 890.1	80 Hg 1007.1	81 Tl 589.4	82 Pb 715.6	83 Bi 703.0	84 Po	85 At	86 Rn
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn						

6	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
7	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Empirical Atomic Radii (pm)																		
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VII B</i>	<i>VIII B</i>	<i>VIII B</i>	<i>VIII B</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1	1																	2
	H																	He
	35																	31
2	3	4											5	6	7	8	9	10
	Li	Be											B	C	N	O	F	Ne
	145	105											85	70.	65	60.	50.	38
3	11	12											13	14	15	16	17	18
	Na	Mg											Al	Si	P	S	Cl	Ar
	180.	150.											125	110.	100.	100.	100.	71
4	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	220.	180.	164	140.	135	140.	140.	140.	135	135	135	135	130.	125	115	115	115	88
5	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54
	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	235	200.	180.	155	145	145	135	130.	135	140.	160.	155	155	145	145	140.	140.	108
6	55	56	57	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86
	Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	260.	215	188	155	145	135	135	130.	135	135	135	150.	190.	180.	160.	190.	127	120.
7	87	88	89	104	105	106	107	108	109	110	111	112						
	Fr	Ra	Ac	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn						
		215	195															

6	58 Ce 183	59 Pr 183	60 Nd 182	61 Pm 181	62 Sm 180.	63 Eu 204	64 Gd 180.	65 Tb 178	66 Dy 177	67 Ho 177	68 Er 176	69 Tm 175	70 Yb 194	71 Lu 173
7	90 Th 180.	91 Pa 180.	92 U 175	93 Np 175	94 Pu 175	95 Am 175	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

Covalent Radii (pm)																			
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
1	1 H 38																		2 He 28
2	3 Li 134	4 Be 90.											5 B 82	6 C 77	7 N 75	8 O 73	9 F 71	10 Ne 67	
3	11 Na 154	12 Mg 130.											13 Al 118	14 Si 111	15 P 106	16 S 102	17 Cl 99	18 Ar 97	
4	19 K 196	20 Ca 174	21 Sc 144	22 Ti 136	23 V 125	24 Cr 127	25 Mn 139	26 Fe 125	27 Co 126	28 Ni 121	29 Cu 138	30 Zn 131	31 Ga 126	32 Ge 122	33 As 119	34 Se 116	35 Br 114	36 Kr 116	
5	37 Rb 211	38 Sr 192	39 Y 162	40 Zr 148	41 Nb 137	42 Mo 145	43 Tc 156	44 Ru 126	45 Rh 135	46 Pd 131	47 Ag 153	48 Cd 148	49 In 144	50 Sn 141	51 Sb 138	52 Te 135	53 I 133	54 Xe 140.	
6	55 Cs 225	56 Ba 198	57 La 169	72 Hf 150.	73 Ta 138	74 W 146	75 Re 159	76 Os 128	77 Ir 137	78 Pt 128	79 Au 144	80 Hg 149	81 Tl 148	82 Pb 147	83 Bi 146	84 Po 135	85 At 150.	86 Rn 145	
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn							

6	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
7	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr

van der Waals Radii (pm)																				
	<i>IA</i>	<i>IIA</i>	<i>IIIB</i>	<i>IVB</i>	<i>VB</i>	<i>VIB</i>	<i>VIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>VIIIB</i>	<i>IB</i>	<i>IIB</i>	<i>IIIA</i>	<i>IVA</i>	<i>VA</i>	<i>VIA</i>	<i>VIIA</i>	<i>VIIIA</i>		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		
1	1 H 109																			2 He 140.
	3 Li 182	4 Be 153													5 B 192	6 C 170.	7 N 155	8 O 152	9 F 147	10 Ne 154
3	11 Na 227	12 Mg 173													13 Al 184	14 Si 210.	15 P 180.	16 S 180.	17 Cl 175	18 Ar 188
	19 K 275	20 Ca 231	21 Sc 211	22 Ti	23 V	24 Cr	25 Mn	26 Fe	27 Co	28 Ni 163	29 Cu 140.	30 Zn 139	31 Ga 187	32 Ge 211	33 As 185	34 Se 190.	35 Br 185	36 Kr 202		
5	37 Rb 303	38 Sr 249	39 Y	40 Zr	41 Nb	42 Mo	43 Tc	44 Ru	45 Rh	46 Pd 163	47 Ag 172	48 Cd 158	49 In 193	50 Sn 217	51 Sb 206	52 Te 206	53 I 198	54 Xe 216		
	55 Cs 343	56 Ba 268	57 La	72 Hf	73 Ta	74 W	75 Re	76 Os	77 Ir	78 Pt 172	79 Au 166	80 Hg 155	81 Tl 196	82 Pb 202	83 Bi 207	84 Po 197	85 At 202	86 Rn 220.		
7	87 Fr	88 Ra	89 Ac	104 Rf	105 Db	106 Sg	107 Bh	108 Hs	109 Mt	110 Ds	111 Rg	112 Cn								

6	58 Ce	59 Pr	60 Nd	61 Pm	62 Sm	63 Eu	64 Gd	65 Tb	66 Dy	67 Ho	68 Er	69 Tm	70 Yb	71 Lu
7	90 Th	91 Pa	92 U	93 Np	94 Pu	95 Am	96 Cm	97 Bk	98 Cf	99 Es	100 Fm	101 Md	102 No	103 Lr