

Electronegativities of the elements (data page)

Contents

Electronegativity (Pauling scale)

Notes

Electronegativity (Allen scale)

References

- WEL
- CRC
- LNG
- Allen Electronegativities

Electronegativity (Pauling scale)

Periodic table of electronegativity by Pauling scale																			
→ Atomic radius decreases → Ionization energy increases → Electronegativity increases →																			
	<u>1</u>	<u>2</u>	<u>3</u>		<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>
Group →																			
↓ Period																			
<u>1</u>	H 2.20																		He
<u>2</u>	Li 0.98	Be 1.57												B 2.04	C 2.55	N 3.04	O 3.44	F 3.98	Ne
<u>3</u>	Na 0.93	Mg 1.31												Al 1.61	Si 1.90	P 2.19	S 2.58	Cl 3.16	Ar
<u>4</u>	K 0.82	Ca 1.00	Sc 1.36		Ti 1.54	V 1.63	Cr 1.66	Mn 1.55	Fe 1.83	Co 1.88	Ni 1.91	Cu 1.90	Zn 1.65	Ga 1.81	Ge 2.01	As 2.18	Se 2.55	Br 2.96	Kr 3.00
<u>5</u>	Rb 0.82	Sr 0.95	Y 1.22		Zr 1.33	Nb 1.6	Mo 2.16	Tc 1.9	Ru 2.2	Rh 2.28	Pd 2.20	Ag 1.93	Cd 1.69	In 1.78	Sn 1.96	Sb 2.05	Te 2.1	I 2.66	Xe 2.60
<u>6</u>	Cs 0.79	Ba 0.89	La 1.1	*	Hf 1.3	Ta 1.5	W 2.36	Re 1.9	Os 2.2	Ir 2.20	Pt 2.28	Au 2.54	Hg 2.00	Tl 1.62	Pb 1.87	Bi 2.02	Po 2.0	At 2.2	Rn 2.2
<u>7</u>	Fr >0.79	Ra 0.9	Ac 1.1	**	Rf	Db	Sg	Bh	Hs	Mt	Ds	Rg	Cn	Nh	Fl	Mc	Lv	Ts	Og
				*															
				*	Ce 1.12	Pr 1.13	Nd 1.14	Pm 1.13	Sm 1.17	Eu 1.2	Gd 1.2	Tb 1.1	Dy 1.22	Ho 1.23	Er 1.24	Tm 1.25	Yb 1.1	Lu 1.27	
				**	Th 1.3	Pa 1.5	U 1.38	Np 1.36	Pu 1.28	Am 1.13	Cm 1.28	Bk 1.3	Cf 1.3	Es 1.3	Fm 1.3	Md 1.3	No 1.3	Lr 1.3 ^[en 2]	

Values are given for the elements in their most common and stable oxidation states.
See also: Electronegativities of the elements (data page)

1. The electronegativity of francium was chosen by Pauling as 0.7, close to that of caesium (also assessed 0.7 at that point). The base value of hydrogen was later increased by 0.10 and caesium's electronegativity was later refined to 0.79; however, no refinements have been made for francium as no experiment has been conducted. However, francium is expected and, to a small extent, observed to be more electronegative than caesium. See francium for details.

2. See Brown, Geoffrey (2012). *The Inaccessible Earth: An integrated view to its structure and composition*. Springer Science & Business Media. p. 88. ISBN 9789401115162.

Number	Symbol	Name	use	WEL	CRC	LNG
1	H	<u>hydrogen</u>	2.20	same		
2	He	<u>helium</u>	no data	same		
3	Li	<u>lithium</u>	0.98	same		
4	Be	<u>beryllium</u>	1.57	same		
5	B	<u>boron</u>	2.04	same		
6	C	<u>carbon</u>	2.55	same		
7	N	<u>nitrogen</u>	3.04	same		
8	O	<u>oxygen</u>	3.44	same		
9	F	<u>fluorine</u>	3.98	3.98	3.98	3.90
10	Ne	<u>neon</u>	no data	same		
11	Na	<u>sodium</u>	0.93	same		
12	Mg	<u>magnesium</u>	1.31	same		
13	Al	<u>aluminium</u>	1.61	same		
14	Si	<u>silicon</u>	1.90	same		
15	P	<u>phosphorus</u>	2.19	same		
16	S	<u>sulfur</u>	2.58	same		
17	Cl	<u>chlorine</u>	3.16	same		
18	Ar	<u>argon</u>	3.20	same		
19	K	<u>potassium</u>	0.82	same		
20	Ca	<u>calcium</u>	1.00	same		
21	Sc	<u>scandium</u>	1.36	same		
22	Ti	<u>titanium</u>	1.54	same		
23	V	<u>vanadium</u>	1.63	same		
24	Cr	<u>chromium</u>	1.66	same		
25	Mn	<u>manganese</u>	1.55	same		
26	Fe	<u>iron</u>	1.83	same		
27	Co	<u>cobalt</u>	1.88	same		
28	Ni	<u>nickel</u>	1.91	same		
29	Cu	<u>copper</u>	1.90	same		
30	Zn	<u>zinc</u>	1.65	same		
31	Ga	<u>gallium</u>	1.81	same		
32	Ge	<u>germanium</u>	2.01	same		
33	As	<u>arsenic</u>	2.18	same		
34	Se	<u>selenium</u>	2.55	same		
35	Br	<u>bromine</u>	2.96	same		
36	Kr	<u>krypton</u>	3.00	3.00	no data	no data
37	Rb	<u>rubidium</u>	0.82	same		
38	Sr	<u>strontium</u>	0.95	same		
39	Y	<u>yttrium</u>	1.22	same		
40	Zr	<u>zirconium</u>	1.33	same		

41	Nb	<u>niobium</u>	1.6	same		
42	Mo	<u>molybdenum</u>	2.16	same		
43	Tc	<u>technetium</u>	1.9	1.9	2.10	2.10
44	Ru	<u>ruthenium</u>	2.2	same		
45	Rh	<u>rhodium</u>	2.28	same		
46	Pd	<u>palladium</u>	2.20	same		
47	Ag	<u>silver</u>	1.93	same		
48	Cd	<u>cadmium</u>	1.69	same		
49	In	<u>indium</u>	1.78	same		
50	Sn	<u>tin</u>	1.96	same		
51	Sb	<u>antimony</u>	2.05	same		
52	Te	<u>tellurium</u>	2.1	same		
53	I	<u>iodine</u>	2.66	same		
54	Xe	<u>xenon</u>	2.6	2.6	2.60	no data
55	Cs	<u>caesium</u>	0.79	same		
56	Ba	<u>barium</u>	0.89	same		
57	La	<u>lanthanum</u>	1.10	same		
58	Ce	<u>cerium</u>	1.12	same		
59	Pr	<u>praseodymium</u>	1.13	same		
60	Nd	<u>neodymium</u>	1.14	same		
61	Pm	<u>promethium</u>	no data	same		
62	Sm	<u>samarium</u>	1.17	same		
63	Eu	<u>europium</u>	no data	same		
64	Gd	<u>gadolinium</u>	1.20	same		
65	Tb	<u>terbium</u>	no data	same		
66	Dy	<u>dysprosium</u>	1.22	same		
67	Ho	<u>holmium</u>	1.23	same		
68	Er	<u>erbium</u>	1.24	same		
69	Tm	<u>thulium</u>	1.25	same		
70	Yb	<u>ytterbium</u>	no data	same		
71	Lu	<u>lutetium</u>	1.27	1.27	1.0	1.0
72	Hf	<u>hafnium</u>	1.3	same		
73	Ta	<u>tantalum</u>	1.5	same		
74	W	<u>tungsten</u>	2.36	2.36	1.7	1.7
75	Re	<u>rhenium</u>	1.9	same		
76	Os	<u>osmium</u>	2.2	same		
77	Ir	<u>iridium</u>	2.20	2.20	2.2	2.2
78	Pt	<u>platinum</u>	2.28	2.28	2.2	2.2
79	Au	<u>gold</u>	2.54	2.54	2.4	2.4
80	Hg	<u>mercury</u>	2.00	2.00	1.9	1.9
81	Tl	<u>thallium</u>	1.62	1.62	1.8	1.8

82	Pb	<u>lead</u>	2.33	2.33	1.8	1.8
83	Bi	<u>bismuth</u>	2.02	2.02	1.9	1.9
84	Po	<u>polonium</u>	2.0	same		
85	At	<u>astatine</u>	2.2	same		
86	Rn	<u>radon</u>	no data	same		
87	Fr	<u>francium</u>	no data	0.7		
88	Ra	<u>radium</u>	0.9	same		
89	Ac	<u>actinium</u>	1.1	same		
90	Th	<u>thorium</u>	1.3	same		
91	Pa	<u>protactinium</u>	1.5	same		
92	U	<u>uranium</u>	1.38	1.38	1.7	1.7
93	Np	<u>neptunium</u>	1.36	1.36	1.3	1.3
94	Pu	<u>plutonium</u>	1.28	1.28	1.3	1.3
95	Am	<u>americium</u>	1.3	1.3	no data	1.3
96	Cm	<u>curium</u>	1.3	1.3	no data	1.3
97	Bk	<u>berkelium</u>	1.3	1.3	no data	1.3
98	Cf	<u>californium</u>	1.3	1.3	no data	1.3
99	Es	<u>einsteinium</u>	1.3	1.3	no data	1.3
100	Fm	<u>fermium</u>	1.3	1.3	no data	1.3
101	Md	<u>mendelevium</u>	1.3	1.3	no data	1.3
102	No	<u>nobelium</u>	1.3	1.3	no data	1.3

Notes

- Separate values for each source are only given where one or more sources differ.
- Electronegativity is not a uniquely defined property and may depend on the definition. The suggested values are all taken from WebElements as a consistent set.
- Many of the highly radioactive elements have values that must be predictions or extrapolations, but are unfortunately not marked as such. This is especially problematic for francium, which by relativistic calculations can be shown to be less electronegative than caesium, but for which the only value (0.7) in the literature predates these calculations.

Electronegativity (Allen scale)

Electronegativity using the Allen scale																		
Group →	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>	<u>10</u>	<u>11</u>	<u>12</u>	<u>13</u>	<u>14</u>	<u>15</u>	<u>16</u>	<u>17</u>	<u>18</u>
↓ Period																		
<u>1</u>	H																	He
	2.300																	4.160
<u>2</u>	Li	Be											B	C	N	O	F	Ne
	0.912	1.576											2.051	2.544	3.066	3.610	4.193	4.787
<u>3</u>	Na	Mg											Al	Si	P	S	Cl	Ar
	0.869	1.293											1.613	1.916	2.253	2.589	2.869	3.242
<u>4</u>	K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
	0.734	1.034	1.191	1.381	1.531	1.651	1.751	1.801	1.841	1.881	1.851	1.591	1.756	1.994	2.211	2.424	2.685	2.966
<u>5</u>	Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
	0.706	0.963	1.121	1.321	1.411	1.471	1.511	1.541	1.561	1.581	1.871	1.521	1.656	1.824	1.984	2.158	2.359	2.582

<u>6</u>	Cs	Ba	Lu	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
	0.65	0.88	1.10	1.16	1.34	1.47	1.60	1.65	1.68	1.72	1.92	1.76	1.78	1.85	2.01	2.19	2.39	2.60
<u>7</u>	Fr	Ra																
	0.67	0.89																

See also: [Electronegativities of the elements \(data page\)](#)

Number	Symbol	Name	Electronegativity
1	H	<u>hydrogen</u>	2.300
2	He	<u>helium</u>	4.160
3	Li	<u>lithium</u>	0.912
4	Be	<u>beryllium</u>	1.576
5	B	<u>boron</u>	2.051
6	C	<u>carbon</u>	2.544
7	N	<u>nitrogen</u>	3.066
8	O	<u>oxygen</u>	3.610
9	F	<u>fluorine</u>	4.193
10	Ne	<u>neon</u>	4.787
11	Na	<u>sodium</u>	0.869
12	Mg	<u>magnesium</u>	1.293
13	Al	<u>aluminium</u>	1.613
14	Si	<u>silicon</u>	1.916
15	P	<u>phosphorus</u>	2.253
16	S	<u>sulfur</u>	2.589
17	Cl	<u>chlorine</u>	2.869
18	Ar	<u>argon</u>	3.242
19	K	<u>potassium</u>	0.734
20	Ca	<u>calcium</u>	1.034
21	Sc	<u>scandium</u>	1.19
22	Ti	<u>titanium</u>	1.38
23	V	<u>vanadium</u>	1.53
24	Cr	<u>chromium</u>	1.65
25	Mn	<u>manganese</u>	1.75
26	Fe	<u>iron</u>	1.80
27	Co	<u>cobalt</u>	1.84
28	Ni	<u>nickel</u>	1.88
29	Cu	<u>copper</u>	1.85
30	Zn	<u>zinc</u>	1.59
31	Ga	<u>gallium</u>	1.756
32	Ge	<u>germanium</u>	1.994
33	As	<u>arsenic</u>	2.211
34	Se	<u>selenium</u>	2.424
35	Br	<u>bromine</u>	2.685
36	Kr	<u>krypton</u>	2.966
37	Rb	<u>rubidium</u>	0.706
38	Sr	<u>strontium</u>	0.963
39	Y	<u>yttrium</u>	1.12
40	Zr	<u>zirconium</u>	1.32

41	Nb	<u>niobium</u>	1.41
42	Mo	<u>molybdenum</u>	1.47
43	Tc	<u>technetium</u>	1.51
44	Ru	<u>ruthenium</u>	1.54
45	Rh	<u>rhodium</u>	1.56
46	Pd	<u>palladium</u>	1.58
47	Ag	<u>silver</u>	1.87
48	Cd	<u>cadmium</u>	1.52
49	In	<u>indium</u>	1.656
50	Sn	<u>tin</u>	1.824
51	Sb	<u>antimony</u>	1.984
52	Te	<u>tellurium</u>	2.158
53	I	<u>iodine</u>	2.359
54	Xe	<u>xenon</u>	2.582
55	Cs	<u>caesium</u>	0.659
56	Ba	<u>barium</u>	0.881
71	Lu	<u>lutetium</u>	1.09
72	Hf	<u>hafnium</u>	1.16
73	Ta	<u>tantalum</u>	1.34
74	W	<u>tungsten</u>	1.47
75	Re	<u>rhenium</u>	1.60
76	Os	<u>osmium</u>	1.65
77	Ir	<u>iridium</u>	1.68
78	Pt	<u>platinum</u>	1.72
79	Au	<u>gold</u>	1.92
80	Hg	<u>mercury</u>	1.76
81	Tl	<u>thallium</u>	1.789
82	Pb	<u>lead</u>	1.854
83	Bi	<u>bismuth</u>	2.01
84	Po	<u>polonium</u>	2.19
85	At	<u>astatine</u>	2.39
86	Rn	<u>radon</u>	2.60
87	Fr	<u>francium</u>	0.67
88	Ra	<u>radium</u>	0.89

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WEL

As quoted at <http://www.webelements.com/> from these sources:

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- Allen, L.C., *J. Am. Chem. Soc.*, **111**, 9003, 1989.

LNG

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Allen Electronegativities

Three references are required to cover the values quoted in the table.

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