

Data Sheet – CHEM 209

Periodic Table

Periodic Table

1
1A

2
2A

3
3A

4
4A

5
5A

6
6A

7
7A

8
8A

1
H
1.008

2
He
4.003

3
Li
6.941

4
Be
9.012

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

19
K
39.10

20
Ca
40.08

21
Sc
44.96

22
Ti
47.88

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
65.38

31
Ga
69.72

32
Ge
72.59

33
As
74.92

34
Se
78.96

35
Br
79.90

36
Kr
83.80

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
(98)

44
Ru
101.1

45
Rh
102.9

46
Pd
106.4

47
Ag
107.9

48
Cd
112.4

49
In
114.8

50
Sn
118.7

51
Sb
121.8

52
Te
127.6

53
I
126.9

54
Xe
131.3

55
Cs
132.9

56
Ba
137.3

57
La
138.9

72
Hf
178.5

73
Ta
180.9

74
W
183.9

75
Re
186.2

76
Os
190.2

77
Ir
192.2

78
Pt
195.1

79
Au
197.0

80
Hg
200.6

81
Tl
204.4

82
Pb
207.2

83
Bi
209.0

84
Po
(209)

85
At
(210)

86
Rn
(222)

87
Fr
(223)

88
Ra
226.0

89**
Ac
(227)

104
Rf
(261)

105
Ha
(262)

106
Sg
(263)

107
Ns
(262)

108
Hs
(265)

109
Mt
(266)

110
Uun
(269)

111
Uuu
(272)

Legend:

1
H
1.008

← Atomic number (Z)

← Atomic symbol

← Atomic mass (amu)

Lanthanides *

58 Ce 140.1	59 Pr 140.9	60 Nd 144.2	61 Pm (145)	62 Sm 150.4	63 Eu 152.0	64 Gd 157.3	65 Tb 158.9	66 Dy 162.5	67 Ho 164.9	68 Er 167.3	69 Tm 168.9	70 Yb 173.0	71 Lu 175.0
90 Th 232.0	91 Pa 231.0	92 U 238.0	93 Np 237.0	94 Pu (244)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (251)	99 Es (252)	100 Fm (257)	101 Md (258)	102 No (259)	103 Lr (260)

Actinides **

Strong Acids: HCl, HBr, HI, HNO₃, H₂SO₄, HClO₄

Strong Bases: Hydroxides of Group 1 (Li to Cs) and Group 2 (Ca, Sr, Ba)

<p>Constants:</p> <p>Gas Constant: $R = 0.08205 \text{ L} \cdot \text{atm} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$ $= 8.314 \text{ L} \cdot \text{kPa} \cdot \text{mol}^{-1} \cdot \text{K}^{-1} = 8.314 \text{ J} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$ $= 0.08314 \text{ L} \cdot \text{bar} \cdot \text{mol}^{-1} \cdot \text{K}^{-1}$</p> <p>Avogadro's number: $N_A = 6.022 \times 10^{23} \text{ mol}^{-1}$</p> <p>Faraday's Constant: $F = 96485 \text{ C/mol electrons}$</p> <p>Planck's Constant: $h = 6.626 \times 10^{-34} \text{ J} \cdot \text{s}$</p> <p>Speed of Light: $c = 2.998 \times 10^8 \text{ m} \cdot \text{s}^{-1}$</p> <p>Rydberg Constant: $R = 1.096776 \times 10^7 \text{ m}^{-1}$</p> <p>Factoring Rydberg Constant: $R_H = R \cdot h \cdot c = 2.18 \times 10^{-18} \text{ J}$</p>	<p>Conversion Factors:</p> <p>$1 \text{ J} = 1 \text{ kg} \cdot \text{m}^2 \cdot \text{s}^{-2}$ $T(\text{K}) = T(^{\circ}\text{C}) + 273.15$ $1 \text{ Pa} = 1 \text{ kg} \cdot \text{m}^{-1} \cdot \text{s}^{-2} = 10^{-5} \text{ bar}$ $1 \text{ L} \cdot \text{atm} = 101.3 \text{ J}$ $1 \text{ atm} = 760.0 \text{ torr} = 101.3 \text{ kPa} = 760.0 \text{ mm Hg} = 1.013 \text{ bar}$ $1 \text{ L} = 10^{-3} \text{ m}^3$ $1 \text{ C} = 1 \text{ J/V}$ STP conditions: 0°C, 100 kPa Electrochemical standard state: 1 atm, 1 M, 25°C</p>
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$$[A]_t = -kt + [A]_0$$

$$\ln[A]_t = -kt + \ln[A]_0$$

$$PV = nRT$$

$$E^{\circ} = E^{\circ}_{\text{cathode}} - E^{\circ}_{\text{anode}}$$

$$c = \lambda \nu$$

$$\ln\left(\frac{[A]_0}{[A]_t}\right) = kt$$

$$\frac{1}{[A]_t} = kt + \frac{1}{[A]_0}$$

$$K = K_c(RT)^{\Delta n}$$

$$pH = -\log[H^+]$$

$$E = E^{\circ} - \frac{0.0592}{n_e} \log Q$$

$$E = h\nu$$

$$E = mc^2$$

$$t_{1/2} = \frac{[A]_0}{2k}$$

$$t_{1/2} = \frac{0.693}{k}$$

$$K_w = K_a \cdot K_b$$

$$ax^2 + bx + c = 0$$

$$E^{\circ} = \frac{RT}{zF} \ln K$$

$$\frac{1}{\lambda} = R \left(\frac{1}{n_1^2} - \frac{1}{n_2^2} \right)$$

$$t_{1/2} = \frac{1}{k[A]_0}$$

$$k = Ae^{(-E_a/RT)}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$E^{\circ} = \frac{0.0592}{n_e} \log K$$

$$\Delta E = -R_H \left(\frac{Z^2}{n_f^2} - \frac{Z^2}{n_i^2} \right)$$

$$\ln\left(\frac{k_2}{k_1}\right) = \frac{E_a}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$\ln\left(\frac{K_2}{K_1}\right) = \frac{\Delta H}{R} \left(\frac{1}{T_1} - \frac{1}{T_2} \right)$$

$$pH = pK_a + \log\left(\frac{[base]}{[acid]}\right)$$

$$nFE^{\circ} = RT \ln K$$