Thermal Properties of the Elements

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Alkaline earth metals	Transition metals
Alkali metals	Lanthanides
Nonmetals	Actinides
Halogens	Other metals
Semimetallics	Solid elements
Inert gases	Liquid elements
	Gaseous elements
	Radioactive

	Group 1	Group 2	Group 3	Group 4	Group 5	Group 6	Group 7	Group 8	Group 9	Group 10	Group 11	Group 12	Group 13	Group 14	Group 15	Group 16	Group 17	Group 18
1	1 hydrogen 1.01 14.304 J/(g·K) 0.18 W/(m·K) - 1s¹ 0.0000899 g/cm³ 13.60 eV **H**																	2 helium 4.00 5.193 J/(g·K) 0.15 W/(m·K) - 1s² 0.0001785 g/cm³ 24.59 eV **He**
2	3 lithium 6.94 3.582 J/(g·K) 84.70 W/(m·K) 56 ·10⁻⁶/K [He]2s¹ 0.534 g/cm³ 5.39 eV **Li**	4 beryllium 9.01 1.825 J/(g·K) 201 W/(m·K) 12.3 ·10⁻⁶/K [He]2s² 1.848 g/cm³ 9.32 eV **Be**											5 boron 10.81 1.026 J/(g·K) 27 W/(m·K) 8.3 ·10⁻⁶/K [He]2s² 2p¹ 2.34 g/cm³ 8.30 eV **B**	6 carbon 12.01 G: 0.709 J/(g·K) D: 0.427 J/(g·K) G: 119-165 W/(m·K) D: 900-4300 W/(m·K) - - [He]2s²2p² [He]2s²2p² G: 2.25 g/cm³ D: 3.51 g/cm³ 11.26 eV 11.26 eV **C**	7 nitrogen 14.01 1.040 J/(g·K) 0.026 W/(m·K) - [He]2s² 2p³ 0.0012506 g/cm³ 14.53 eV **N**	8 oxygen 16.00 0.918 J/(g·K) 0.026 W/(m·K) - [He]2s² 2p⁴ 0.00143 g/cm³ 13.62 eV **O**	9 fluorine 19.00 0.824 J/(g·K) 0.028 W/(m·K) - [He]2s² 2p⁵ 0.001696 g/cm³ 17.42 eV **F**	10 neon 20.18 1.030 J/(g·K) 0.049 W/(m·K) - [He]2s² 2p⁶ 0.000899 g/cm³ 21.56 eV **Ne**
3	11 sodium 22.99 1.228 J/(g·K) 1.41 W/(m·K) 71 ·10⁻⁶/K [Ne]3s¹ 0.968 g/cm³ 5.14 eV **Na**	12 magnesium 24.31 1.023 J/(g·K) 156 W/(m·K) 26 ·10⁻⁶/K [Ne]3s² 1.738 g/cm³ 7.65 eV **Mg**											13 aluminium 26.98 0.897 J/(g·K) 237 W/(m·K) 23.86 ·10⁻⁶/K [Ne]3s² 3p¹ 2.700 g/cm³ 5.99 eV **Al**	14 silicon 28.09 0.705 J/(g·K) 148 W/(m·K) 2.53 ·10⁻⁶/K [Ne]3s² 3p² 2.330 g/cm³ 8.15 eV **Si**	15 phosphorus 30.97 0.769 J/(g·K) 0.235 W/(m·K) 372 ·10⁻⁶/K [Ne]3s² 3p³ 2.67 g/cm³ (black) 10.49 eV **P**	16 sulfur 32.07 0.710 J/(g·K) 0.269 W/(m·K) -180 ·10⁻⁶/K [Ne]3s² 3p⁴ 2.069 g/cm³ 10.36 eV **S**	17 chlorine 35.45 0.479 J/(g·K) 0.0089 W/(m·K) - [Ne]3s² 3p⁵ 0.00321 g/cm³ 12.97 eV **Cl**	18 argon 39.95 0.520 J/(g·K) 0.018 W/(m·K) - [Ne] 3s² 3p⁶ 0.00178 g/cm³ 15.76 eV **Ar**
4	19 potassium 39.10 0.757 J/(g·K) 102.4 W/(m·K) 84 ·10⁻⁶/K [Ar]4s¹ 0.856 g/cm³ 4.34 eV **K**	20 calcium 40.08 0.647 J/(g·K) 201 W/(m·K) 25.2 ·10⁻⁶/K [Ar]4s² 1.55 g/cm³ 6.11 eV **Ca**	21 scandium 44.96 0.568 J/(g·K) 15.8 W/(m·K) - [Ar]3d¹ 4s² 2.985 g/cm³ 6.56 eV **Sc**	22 titanium 47.87 0.523 J/(g·K) 21.9 W/(m·K) 8.35 ·10⁻⁶/K [Ar]3d² 4s² 4.507 g/cm³ 6.83 eV **Ti**	23 vanadium 50.94 0.489 J/(g·K) 30.7 W/(m·K) 8.3 ·10⁻⁶/K [Ar]3d³ 4s² 6.11 g/cm³ 6.75 eV **V**	24 chromium 52.00 0.449 J/(g·K) 93.7 W/(m·K) 6.6 ·10⁻⁶/K [Ar]3d⁵ 4s¹ 7.14 g/cm³ 6.77 eV **Cr**	25 manganese 54.94 0.479 J/(g·K) 7.82 W/(m·K) 23 ·10⁻⁶/K [Ar]3d⁵ 4s² 7.47 g/cm³ 7.43 eV **Mn**	26 iron 55.85 0.449 J/(g·K) 76.6 W/(m·K) 11.5 ·10⁻⁶/K [Ar]3d⁶ 4s² 7.874 g/cm³ 7.90 eV **Fe**	27 cobalt 58.93 0.421 J/(g·K) 100 W/(m·K) 12.6 ·10⁻⁶/K [Ar]3d⁷ 4s² 8.9 g/cm³ 7.88 eV **Co**	28 nickel 58.69 0.444 J/(g·K) 90.7 W/(m·K) 13 ·10⁻⁶/K [Ar]3d⁸ 4s² 8.908 g/cm³ 7.64 eV **Ni**	29 copper 63.55 0.385 J/(g·K) 404 W/(m·K) 16.8 ·10⁻⁶/K [Ar]3d¹⁰ 4s¹ 8.89 g/cm³ 7.73 eV **Cu**	30 zinc 65.41 0.388 J/(g·K) 120 W/(m·K) 83.3 ·10⁻⁶/K [Ar]3d¹⁰ 4s² 7.14 g/cm³ 9.39 eV **Zn**	31 gallium 69.72 0.371 J/(g·K) 40.6 W/(m·K) 5.2 ·10⁻⁶/K [Ar]3d¹⁰ 4s² 4p¹ 5.904 g/cm³ 6.00 eV **Ga**	32 germanium 72.61 0.320 J/(g·K) 59.9 W/(m·K) 5.2 ·10⁻⁶/K [Ar]3d¹⁰ 4s² 4p² 5.323 g/cm³ 7.90 eV **Ge**	33 arsenic 74.92 0.329 J/(g·K) 50 W/(m·K) 6.0 ·10⁻⁶/K [Ar]3d¹⁰ 4s² 4p³ 5.72 g/cm³ 9.82 eV **As**	34 selenium 78.96 0.321 J/(g·K) 2.04 W/(m·K) 49.27 ·10⁻⁶/K [Ar]3d¹⁰ 4s² 4p⁴ 4.79 g/cm³ 9.75 eV **Se**	35 bromine 79.90 0.226 J/(g·K) 0.122 W/(m·K) - [Ar] 3d¹⁰ 4s² 4p⁵ 3.119 g/cm³ 11.81 eV **Br**	36 krypton 83.80 0.248 J/(g·K) 0.00949 W/(m·K) - [Ar] 3d¹⁰ 4s²4p⁶ 0.003749 g/cm³ 14.00 eV **Kr**
5	37 rubidium 85.47 0.363 J/(g·K) 58.2 W/(m·K) 270 ·10⁻⁶/K [Kr]5s¹ 1.532 g/cm³ 4.18 eV **Rb**	38 strontium 87.62 0.301 J/(g·K) 35.3 W/(m·K) - [Kr]5s² 2.63 g/cm³ 5.69 eV **Sr**	39 yttrium 88.91 0.298 J/(g·K) 17.2 W/(m·K) 28.3 ·10⁻⁶/K [Kr]4d¹ 5s² 4.472 g/cm³ 6.22 eV **Y**	40 zirconium 91.22 0.278 J/(g·K) 22.7 W/(m·K) 5.8 ·10⁻⁶/K [Kr]4d² 5s² 6.511 g/cm³ 6.63 eV **Zr**	41 niobium 92.91 0.265 J/(g·K) 53.7 W/(m·K) 7.31 ·10⁻⁶/K [Kr]4d⁴ 5s¹ 8.57 g/cm³ 6.76 eV **Nb**	42 molybdenum 95.94 0.251 J/(g·K) 138.5 W/(m·K) 5.1 ·10⁻⁶/K [Kr]4d⁵ 5s¹ 10.216 g/cm³ 7.09 eV **Mo**	43 technetium 98.91 0.25 J/(g·K) 50.6 W/(m·K) - [Kr]4d⁵ 5s² 11.5 g/cm³ 7.28 eV **Tc**	44 ruthenium 101.07 0.238 J/(g·K) 117 W/(m·K) 9.63 ·10⁻⁶/K [Kr]4d⁷ 5s¹ 12.37 g/cm³ 7.36 eV **Ru**	45 rhodium 102.91 0.243 J/(g·K) 87.2 W/(m·K) 8.5 ·10⁻⁶/K [Kr]4d⁸ 5s¹ 12.45 g/cm³ 7.46 eV **Rh**	46 palladium 106.42 0.244 J/(g·K) 71.8 W/(m·K) 11.9 ·10⁻⁶/K [Kr] 4d¹⁰ 12.023 g/cm³ 8.34 eV **Pd**	47 silver 107.87 0.235 J/(g·K) 429 W/(m·K) 6.0 ·10⁻⁶/K [Kr] 4d¹⁰ 5s¹ 10.49 g/cm³ 7.58 eV **Ag**	48 cadmium 112.41 0.232 J/(g·K) 96.8 W/(m·K) 29.4 ·10⁻⁶/K [Kr] 4d¹⁰ 5s² 8.65 g/cm³ 8.99 eV **Cd**	49 indium 114.82 0.233 J/(g·K) 81.6 W/(m·K) 30 ·10⁻⁶/K [Kr] 4d¹⁰ 5s² 5p¹ 7.31 g/cm³ 5.79 eV **In**	50 tin 118.71 0.228 J/(g·K) 66.3 W/(m·K) 27 ·10⁻⁶/K [Kr] 4d¹⁰ 5s² 5p² 7.31 g/cm³ 7.34 eV **Sn**	51 antimony 121.75 0.207 J/(g·K) 24.3 W/(m·K) 11.0 ·10⁻⁶/K [Kr] 4d¹⁰ 5s² 5p³ 6.697 g/cm³ 8.64 eV **Sb**	52 tellurium 127.60 0.202 J/(g·K) 2.35 W/(m·K) 16.8 ·10⁻⁶/K [Kr] 4d¹⁰ 5s² 5p⁴ 6.24 g/cm³ 9.01 eV **Te**	53 iodine 126.90 0.145 J/(g·K) 0.449 W/(m·K) - [Kr] 4d¹⁰ 5s² 5p⁵ 4.94 g/cm³ 10.45 eV **I**	54 xenon 131.29 0.158 J/(g·K) 0.00569 W/(m·K) - [Kr] 4d¹⁰ 5s²5p⁶ 0.0059 g/cm³ 12.13 eV **Xe**
6	55 cesium 132.91 0.242 J/(g·K) 36 W/(m·K) 291 ·10⁻⁶/K [Xe]6s¹ 1.879 g/cm³ 3.89 eV **Cs**	56 barium 137.33 0.204 J/(g·K) 18.4 W/(m·K) 19 ·10⁻⁶/K [Xe]6s² 3.62 g/cm³ 5.21 eV **Ba**	lanthanum **lanthanides** lanthanides atomic number: 57-71	72 hafnium 178.49 0.144 J/(g·K) 23 W/(m·K) 6.6 ·10⁻⁶/K [Xe] 4f¹⁴ 5d² 6s² 13.31 g/cm³ 6.83 eV **Hf**	73 tantalum 180.95 0.140 J/(g·K) 57.5 W/(m·K) 6.5 ·10⁻⁶/K [Xe] 4f¹⁴ 5d³ 6s² 16.65 g/cm³ 7.89 eV **Ta**	74 tungsten 183.84 0.132 J/(g·K) 174.0 W/(m·K) 4.5 ·10⁻⁶/K [Xe] 4f¹⁴ 5d⁴ 6s² 19.25 g/cm³ 7.98 eV **W**	75 rhenium 186.21 0.137 J/(g·K) 48 W/(m·K) 6.6 ·10⁻⁶/K [Xe] 4f¹⁴ 5d⁵ 6s² 21.02 g/cm³ 7.88 eV **Re**	76 osmium 190.23 0.130 J/(g·K) 88 W/(m·K) 6.58 ·10⁻⁶/K [Xe] 4f¹⁴ 5d⁶ 6s² 22.59 g/cm³ 8.7 eV **Os**	77 iridium 192.22 0.131 J/(g·K) 147 W/(m·K) 6.5 ·10⁻⁶/K [Xe] 4f¹⁴ 5d⁷ 6s² 22.56 g/cm³ 9.1 eV **Ir**	78 platinum 195.08 0.133 J/(g·K) 71.6 W/(m·K) 9.09 ·10⁻⁶/K [Xe] 4f¹⁴ 5d⁹ 6s¹ 21.45 g/cm³ 9.0 eV **Pt**	79 gold 196.97 0.129 J/(g·K) 317 W/(m·K) 14.2 ·10⁻⁶/K [Xe] 4f¹⁴ 5d¹⁰ 6s¹ 19.32 g/cm³ 9.23 eV **Au**	80 mercury 200.59 0.140 J/(g·K) 8.34 W/(m·K) 182 ·10⁻⁶/K [Xe] 4f¹⁴ 5d¹⁰ 6s² 13.546 g/cm³ 10.44 eV **Hg**	81 thallium 204.38 0.129 J/(g·K) 46.1 W/(m·K) 29.4 ·10⁻⁶/K [Xe] 4f¹⁴ 5d¹⁰6s²6p¹ 11.85 g/cm³ 6.11 eV **Tl**	82 lead 207.20 0.129 J/(g·K) 35.3 W/(m·K) 27 ·10⁻⁶/K [Xe] 4f¹⁴ 5d¹⁰6s²6p² 11.34 g/cm³ 7.42 eV **Pb**	83 bismuth 208.98 0.122 J/(g·K) 7.87 W/(m·K) 13.5 ·10⁻⁶/K [Xe] 4f¹⁴ 5d¹⁰6s²6p³ 9.78 g/cm³ 7.29 eV **Bi**	84 polonium 209.98 327.5 °C 23.0 J/g 1750 °C [Xe] 4f¹⁴ 5d¹⁰6s²6p⁴ 9.196 g/cm³ 8.42 eV **Po**	85 astatine 209.99 0.48 J/(g·K) 1.7 W/(m·K) 962 °C [Xe] 4f¹⁴ 5d¹⁰6s²6p⁵ - - **At**	86 radon 222 302 °C 0.094 J/(g·K) 0.00364 W/(m·K) 337 °C [Xe] 4f¹⁴ 5d¹⁰6s²6p⁶ 0.00973 g/cm³ 10.75 eV **Rn**
7	87 francium 223.02 0.24 J/(g·K) 15 W/(m·K) 291 ·10⁻⁶/K [Rn]7s¹ 1.870 g/cm³ - **Fr**	88 radium 226.03 0.094 J/(g·K) 18.6 W/(m·K) - [Rn]7s² 5.5 g/cm³ 5.28 eV **Ra**	actinium **actinides** actinides atomic number: 89-103															

lanthanides

57 lanthanum 138.91 0.195 J/(g·K) 13.5 W/(m·K) 4.9 ·10⁻⁶/K [Xe] 5d¹ 6s² 6.146 g/cm³ 5.58 eV **La**	58 cerium 140.12 0.192 J/(g·K) 11.4 W/(m·K) 8.5 ·10⁻⁶/K [Xe] 4f¹ 5d¹ 6s² 6.689 g/cm³ 5.54 eV **Ce**	59 praseo-dymium 140.91 0.193 J/(g·K) 12.5 W/(m·K) 4.8 ·10⁻⁶/K [Xe] 4f³ 6s² 6.64 g/cm³ 5.46 eV **Pr**	60 neodymium 144.24 0.190 J/(g·K) 16.5 W/(m·K) 6.7 ·10⁻⁶/K [Xe] 4f⁴ 6s² 7.007 g/cm³ 5.53 eV **Nd**	61 promethium 146.92 0.18 J/(g·K) 17.9 W/(m·K) - [Xe] 4f⁵ 6s² 7.22 g/cm³ 5.55 eV **Pm**	62 samarium 150.36 0.197 J/(g·K) 13.3 W/(m·K) - [Xe] 4f⁶ 6s² 7.53 g/cm³ 5.64 eV **Sm**	63 europium 151.96 0.182 J/(g·K) 13.9 W/(m·K) 26 ·10⁻⁶/K [Xe] 4f⁷ 6s² 5.244 g/cm³ 5.67 eV **Eu**	64 gadolinium 157.25 0.236 J/(g·K) 10.6 W/(m·K) 6.4 ·10⁻⁶/K [Xe] 4f⁷ 5d¹ 6s² 7.901 g/cm³ 6.15 eV **Gd**	65 terbium 158.93 0.182 J/(g·K) 11.1 W/(m·K) - [Xe] 4f⁹ 6s² 8.219 g/cm³ 5.86 eV **Tb**	66 dysprosium 162.50 0.173 J/(g·K) 10.7 W/(m·K) 8.6 ·10⁻⁶/K [Xe] 4f¹⁰ 6s² 8.551 g/cm³ 5.94 eV **Dy**	67 holmium 164.93 0.165 J/(g·K) 16.2 W/(m·K) - [Xe] 4f¹¹ 6s² 8.8 g/cm³ 6.02 eV **Ho**	68 erbium 167.26 0.168 J/(g·K) 14.3 W/(m·K) 9.2 ·10⁻⁶/K [Xe] 4f¹² 6s² 9.066 g/cm³ 6.11 eV **Er**	69 thulium 168.93 0.160 J/(g·K) 16.8 W/(m·K) - [Xe] 4f¹³ 6s² 9.321 g/cm³ 6.18 eV **Tm**	70 ytterbium 173.04 0.155 J/(g·K) 34.9 W/(m·K) 25 ·10⁻⁶/K [Xe] 4f¹⁴ 6s² 6.965 g/cm³ 6.25 eV **Yb**	71 lutetium 174.97 0.154 J/(g·K) 16.4 W/(m·K) - [Xe] 4f¹⁴ 5d¹ 6s² 9.841 g/cm³ 5.43 eV **Lu**

actinides

89 actinium 227.03 0.120 J/(g·K) 12 W/(m·K) - [Rn] 6d¹ 7s² 10.07 g/cm³ 5.17 eV **Ac**	90 thorium 232.04 0.113 J/(g·K) 54 W/(m·K) - [Rn] 6d² 7s² 11.724 g/cm³ 6.08 eV **Th**	91 protactinium 231.04 0.12 J/(g·K) 47 W/(m·K) - [Rn] 5f² 6d¹ 7s² 15.37 g/cm³ 5.89 eV **Pa**	92 uranium 238.03 0.116 J/(g·K) 27.6 W/(m·K) - [Rn] 5f³ 6d¹ 7s² 19.16 g/cm³ 6.19 eV **U**	93 neptunium 237.05 - 6.3 W/(m·K) - [Rn] 5f⁴ 6d¹ 7s² 20.25 g/cm³ 6.27 eV **Np**	94 plutonium 244.06 0.13 J/(g·K) 6.74 W/(m·K) - [Rn] 5f⁶ 7s² 19.74 g/cm³ 6.06 eV **Pu**	95 americium 243 1176 °C 59.2 J/g 2607 °C [Rn] 5f⁷ 7s² 13.67 g/cm³ 5.99 eV **Am**	96 curium 247.07 641 °C - - 3110 °C [Rn] 5f⁷ 6d¹ 7s² 13.51 g/cm³ 6.02 eV **Cm**	97 berkelium 247 1340 °C - - [Rn] 5f⁹ 7s² 14.78 g/cm³ 6.23 eV **Bk**	98 californium 251 986 °C - - [Rn] 5f¹⁰ 7s² 15.1 g/cm³ 6.30 eV **Cf**	99 einsteinium 252 950 °C - - [Rn] 5f¹¹ 7s² 13.50 g/cm³ 6.42 eV **Es**	100 fermium 257.10 860 °C - - [Rn] 5f¹² 7s² - - **Fm**	101 mendelevium 258 1527 °C - - [Rn] 5f¹³ 7s² 6.50 eV **Md**	102 nobelium 259 - - - - [Rn] 5f¹⁴ 7s² 6.58 eV **No**	103 lawrencium 260.11 827 °C - - - [Rn] 5f¹⁴ 7s² 7p¹ 6.65 eV **Lr**

原子番号	正式名称	原子質量
比熱容量	元素名 常温（RT）の標準条件下で概ね有効な値	融点
熱伝導率		融解熱
線膨張係数		沸点
電子配置	密度	イオン化エネルギー

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参考文献:

Handbook of Chemistry and Physics, 76th Edition, 1995-1996
D'ANS LAX
Lehrbuch der Anorganischen Chemie, Holleman & Wiberg, de Gruyter Verlag, 1985
Others

Version 3.0

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Leading Thermal Analysis

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