

Metals and Nonmetals

Order of Elements in the Periodic Table

Scientists arrange the elements in a table called the periodic table. So, what is the periodic table?

The Periodic Table: It consists of squares arranged in horizontal rows called **periods** and vertical columns called **groups**. Each square contains information about an element, including its name, chemical symbol, and the number of protons that distinguishes it from other elements.

1 H Hydrogen 1.008																	2 He Helium 4.002																														
3 Li Lithium 6.94	4 Be Beryllium 9.012											5 B Boron 10.81	6 C Carbon 12.011	7 N Nitrogen 14.007	8 O Oxygen 15.999	9 F Fluorine 18.998	10 Ne Neon 20.179																														
11 Na Sodium 22.989	12 Mg Magnesium 24.305											13 Al Aluminum 26.981	14 Si Silicon 28.085	15 P Phosphorus 30.973	16 S Sulfur 32.059	17 Cl Chlorine 35.453	18 Ar Argon 39.948																														
19 K Potassium 39.098	20 Ca Calcium 40.078	21 Sc Scandium 44.955	22 Ti Titanium 47.867	23 V Vanadium 50.941	24 Cr Chromium 51.996	25 Mn Manganese 54.938	26 Fe Iron 55.845	27 Co Cobalt 58.933	28 Ni Nickel 58.693	29 Cu Copper 63.546	30 Zn Zinc 65.38	31 Ga Gallium 69.723	32 Ge Germanium 72.63	33 As Arsenic 74.921	34 Se Selenium 78.971	35 Br Bromine 79.904	36 Kr Krypton 83.798																														
37 Rb Rubidium 85.467	38 Sr Strontium 87.62	39 Y Yttrium 88.906	40 Zr Zirconium 91.224	41 Nb Niobium 92.906	42 Mo Molybdenum 95.94	43 Tc Technetium (98)	44 Ru Ruthenium 101.07	45 Rh Rhodium 101.065	46 Pd Palladium 106.42	47 Ag Silver 107.868	48 Cd Cadmium 112.414	49 In Indium 114.818	50 Sn Tin 118.71	51 Sb Antimony 121.757	52 Te Tellurium 127.6	53 I Iodine 126.904	54 Xe Xenon 131.29																														
55 Cs Cesium 132.905	56 Ba Barium 137.327	57-71 Lanthanides	72 Hf Hafnium 178.49	73 Ta Tantalum 180.947	74 W Tungsten 183.84	75 Re Rhenium 186.207	76 Os Osmium 190.23	77 Ir Iridium 192.227	78 Pt Platinum 195.084	79 Au Gold 196.966	80 Hg Mercury 200.592	81 Tl Thallium 204.38	82 Pb Lead 207.2	83 Bi Bismuth 208.98	84 Po Polonium (209)	85 At Astatine (210)	86 Rn Radon (222)																														
87 Fr Francium (223)	88 Ra Radium (226)	89-103 Actinides	104 Rf Rutherfordium (261)	105 Db Dubnium (262)	106 Sg Seaborgium (263)	107 Bh Bohrium (264)	108 Hs Hassium (277)	109 Mt Meitnerium (278)	110 Ds Darmstadtium (281)	111 Rg Roentgenium (282)	112 Cn Copernicium (285)	113 Nh Nihonium (284)	114 Fl Flerovium (289)	115 Mc Moscovium (288)	116 Lv Livermorium (293)	117 Ts Tennessine (294)	118 Og Oganesson (294)																														
<table border="1"> <tr> <td>57 La Lanthanum 138.905</td> <td>58 Ce Cerium 140.116</td> <td>59 Pr Praseodymium 140.907</td> <td>60 Nd Neodymium 144.242</td> <td>61 Pm Promethium (145)</td> <td>62 Sm Samarium 150.36</td> <td>63 Eu Europium 151.964</td> <td>64 Gd Gadolinium 157.25</td> <td>65 Tb Terbium 158.925</td> <td>66 Dy Dysprosium 162.5</td> <td>67 Ho Holmium 164.930</td> <td>68 Er Erbium 167.259</td> <td>69 Tm Thulium 168.934</td> <td>70 Yb Ytterbium 173.054</td> <td>71 Lu Lutetium 174.967</td> </tr> <tr> <td>89 Ac Actinium (227)</td> <td>90 Th Thorium 232.037</td> <td>91 Pa Protactinium 231.036</td> <td>92 U Uranium 238.028</td> <td>93 Np Neptunium (237)</td> <td>94 Pu Plutonium (244)</td> <td>95 Am Americium (243)</td> <td>96 Cm Curium (247)</td> <td>97 Bk Berkelium (247)</td> <td>98 Cf Californium (251)</td> <td>99 Es Einsteinium (252)</td> <td>100 Fm Fermium (257)</td> <td>101 Md Mendelevium (288)</td> <td>102 No Nobelium (289)</td> <td>103 Lr Lawrencium (260)</td> </tr> </table>																		57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.907	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.5	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967	89 Ac Actinium (227)	90 Th Thorium 232.037	91 Pa Protactinium 231.036	92 U Uranium 238.028	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (288)	102 No Nobelium (289)	103 Lr Lawrencium (260)
57 La Lanthanum 138.905	58 Ce Cerium 140.116	59 Pr Praseodymium 140.907	60 Nd Neodymium 144.242	61 Pm Promethium (145)	62 Sm Samarium 150.36	63 Eu Europium 151.964	64 Gd Gadolinium 157.25	65 Tb Terbium 158.925	66 Dy Dysprosium 162.5	67 Ho Holmium 164.930	68 Er Erbium 167.259	69 Tm Thulium 168.934	70 Yb Ytterbium 173.054	71 Lu Lutetium 174.967																																	
89 Ac Actinium (227)	90 Th Thorium 232.037	91 Pa Protactinium 231.036	92 U Uranium 238.028	93 Np Neptunium (237)	94 Pu Plutonium (244)	95 Am Americium (243)	96 Cm Curium (247)	97 Bk Berkelium (247)	98 Cf Californium (251)	99 Es Einsteinium (252)	100 Fm Fermium (257)	101 Md Mendelevium (288)	102 No Nobelium (289)	103 Lr Lawrencium (260)																																	

Elements in the same group have similar physical and chemical properties, and these properties repeat periodically in each period. That's why it's called the periodic table.

Metals and Their Properties

Metals are located on the left and middle of the periodic table (except for hydrogen).

										H							He
Li	Be										B	C	N	O	F	Ne	
Na	Mg										Al	Si	P	S	Cl	Ar	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac	minhaaji.net														

فلزات
 لافلزات

Properties of Metals:

1. Metals are solid at room temperature (except for mercury, which is liquid).
2. Metals are shiny.
3. Metals are malleable and ductile, meaning they can be hammered into sheets or drawn into wires. For example, aluminum foil used for food packaging and copper wires.
4. Metals are good conductors of heat. When you touch a metal spoon, it feels warm after stirring hot food. Metals vary in their ability to conduct heat, with aluminum and iron being good conductors. That's why they are used in cookware.
5. Metals are good conductors of electricity. Metals can pass electric current in a closed electrical circuit. Metals also vary in their ability to conduct electricity, with copper and silver being good conductors. That's why copper is used in electrical wires.

Nonmetals and Their Properties

Nonmetals are located on the right side of the periodic table.

										H							He
Li	Be										B	C	N	O	F	Ne	
Na	Mg										Al	Si	P	S	Cl	Ar	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe
Cs	Ba	La	Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn
Fr	Ra	Ac															

▶ فلزات ▶ لافلزات

Properties of Nonmetals:

- Nonmetals can be solid, liquid, or gas at room temperature. For example:
 - Phosphorus (P_4) and iodine (I_2) are solid.
 - Bromine (Br_2) is liquid.
 - Most nonmetals are in the gas state, such as oxygen (O_2) and nitrogen (N_2).
- Nonmetals are not shiny.
- Nonmetals are not malleable or ductile. When nonmetals in solid form are struck, they crumble.
- Nonmetals are poor conductors of heat and electricity. Despite carbon being a nonmetal, it is a conductor of electricity.

Uses of Nonmetals:

- Phosphorus is used in the production of fertilizers and matchstick heads. It is also required by the human body in limited quantities and obtained from seafood, chicken, and nuts.
- Chlorine is used in water disinfection tablets and bleach.

Metalloids and Their Properties

There are elements that separate metals and nonmetals in the periodic table. These elements share common properties with both metals and nonmetals and are called metalloids.

Metalloids: They are a group of elements that share some properties with metals and others with nonmetals.

- أشباه الفلزات -

1 H Hydrogen																	2 He Helium																												
3 Li Lithium	4 Be Beryllium																	10 Ne Neon																											
11 Na Sodium	12 Mg Magnesium																	18 Ar Argon																											
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																												
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																												
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																												
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	113 Nh Nihonium	114 Fl Flerovium	115 Mc Moscovium	116 Lv Livermorium	117 Ts Tennessine	118 Og Oganesson																												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td>58 Ce Cerium</td> <td>59 Pr Praseodymium</td> <td>60 Nd Neodymium</td> <td>61 Pm Promethium</td> <td>62 Sm Samarium</td> <td>63 Eu Europium</td> <td>64 Gd Gadolinium</td> <td>65 Tb Terbium</td> <td>66 Dy Dysprosium</td> <td>67 Ho Holmium</td> <td>68 Er Erbium</td> <td>69 Tm Thulium</td> <td>70 Yb Ytterbium</td> <td>71 Lu Lutetium</td> </tr> <tr> <td>90 Th Thorium</td> <td>91 Pa Protactinium</td> <td>92 U Uranium</td> <td>93 Np Neptunium</td> <td>94 Pu Plutonium</td> <td>95 Am Americium</td> <td>96 Cm Curium</td> <td>97 Bk Berkelium</td> <td>98 Cf Californium</td> <td>99 Es Einsteinium</td> <td>100 Fm Fermium</td> <td>101 Md Mendelevium</td> <td>102 No Nobelium</td> <td>103 Lr Lawrencium</td> </tr> </tbody> </table>																		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
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																																

Metalloids are solid at room temperature. Silicon (Si) and germanium (Ge) are examples of metalloids. They are known for their ability to conduct electricity, so they are used in the production of electronic devices.