Oxidizing and reducing agents are key components in redox reactions, where electrons are transferred between substances.

Oxidizing agents (oxidants) accept electrons and are reduced in the process. They cause other substances to lose electrons and become oxidized. Examples of oxidizing agents include:

Oxygen (O_2)

Hydrogen peroxide (H_2O_2)

Halogens (F_2, Cl_2, Br_2)45

Reducing agents (reductants) donate electrons and are oxidized in the process. They cause other substances to gain electrons and become reduced. Examples of reducing agents include:

Hydrogen (H_2)

Carbon monoxide (CO)

Alkali metals (Li, Na, K)79

Examples of Redox Reactions

Combustion of magnesium:

$Mg + O_2 \rightarrow MgO$

Here, magnesium is the reducing agent, and oxygen is the oxidizing agent7.

Formation of sodium chloride:

$2Na + Cl_2 \rightarrow 2NaCl$

Sodium acts as the reducing agent, while chlorine is the oxidizing agent11.

Reduction of copper oxide:

$CuO + H_2 \rightarrow Cu + H_2O$

Hydrogen serves as the reducing agent, and copper oxide is the oxidizing agent3.

These reactions demonstrate the transfer of electrons between substances, with oxidizing agents gaining electrons and reducing agents losing them.

Let's break down the reaction

$Mg + O_2 \rightarrow MgO$ in detail:

Reactants:

Mg: Magnesium (a metal)

O_2: Oxygen gas (a non-metal)

Product:

MgO: Magnesium oxide (an ionic compound)

Explanation of the Process:

Electron Transfer:

Magnesium atoms lose electrons to become Mg^{2+} ions.

Oxygen atoms gain electrons to become O^{2-} ions.

Oxidation:

$Mg \rightarrow Mg^{2+} + 2e^-$

Magnesium is oxidized (loses electrons).

Magnesium is the reducing agent.

Reduction:

$O_2 + 4e^- \rightarrow 2O^{2-}$

Oxygen is reduced (gains electrons).

Oxygen is the oxidizing agent.

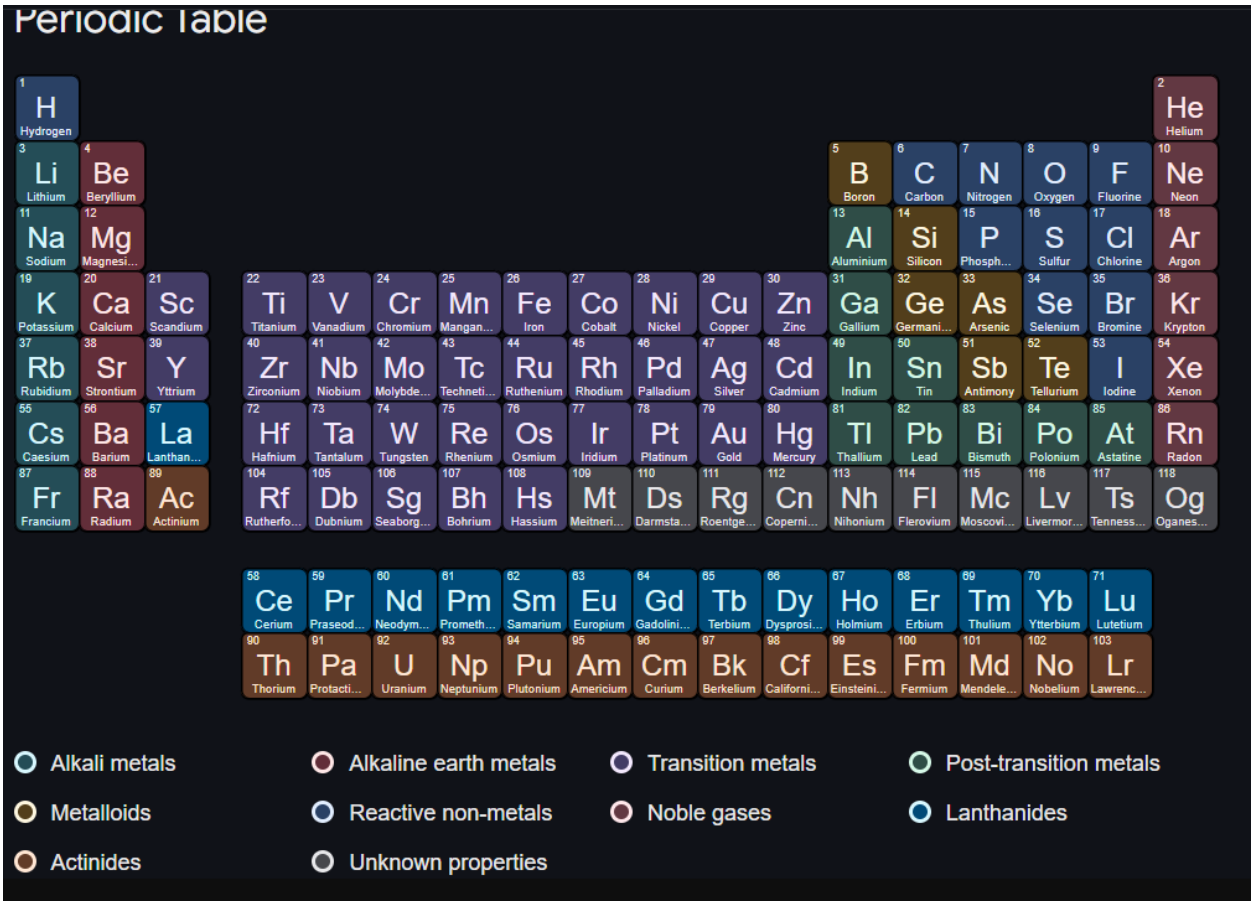
Ionic Bond Formation:

The Mg^{2+} and O^{2-} ions are attracted to each other, forming an ionic bond.

Balanced Equation:

The fully balanced equation is: $2Mg + O_2 \rightarrow 2MgO$

This reaction is exothermic, releasing energy in the form of heat and light, which is why burning magnesium produces a bright white flame.


Periodic Table
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
11 Na Sodium
12 Mg Magnesi...
13 Al Aluminium
14 Si Silicon
15 P Phosph...
16 S Sulfur
17 Cl Chlorine
18 Ar Argon
19 K Potassium
20 Ca Calcium
21 Sc Scandium
22 Ti Titanium
23 V Vanadium
24 Cr Chromium
25 Mn Mangan...
26 Fe Iron
27 Co Cobalt
28 Ni Nickel
29 Cu Copper
30 Zn Zinc
31 Ga Gallium
32 Ge Germani...
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 Molybde...
43 Tc Techneti...
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 Caesium
56 Ba Barium
57 La Lanthan...
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 Rutherfo...
105 Db Dubnium
106 Sg Seaborg...
107 Bh Bohrium
108 Hs Hassium
109 Mt Meitneri...
110 Ds Darmsta...
111 Rg Roentge...
112 Cn Coperni...
113 Nh Nihonium
114 Fl Flerovium
115 Mc Moscovi...
116 Lv Livermor...
117 Ts Tenness...
118 Og Oganes...
58 Ce Cerium
59 Pr Praseod...
60 Nd Neodym...
61 Pm Prometh...
62 Sm Samarium
63 Eu Europium
64 Gd Gadolini...
65 Tb Terbium
66 Dy Dysprosi...
67 Ho Holmium
68 Er Erbium
69 Tm Thulium
70 Yb Ytterbium
71 Lu Lutetium
90 Th Thorium
91 Pa Protacti...
92 U Uranium
93 Np Neptunium
94 Pu Plutonium
95 Am Americium
96 Cm Curium
97 Bk Berkelium
98 Cf Californi...
99 Es Einsteini...
100 Fm Fermium
101 Md Mendele...
102 No Nobelium
103 Lr Lawrenc...
Alkali metals
Alkaline earth metals
Transition metals
Post-transition metals
Metalloids
Reactive non-metals
Noble gases
Lanthanides
Actinides
Unknown properties