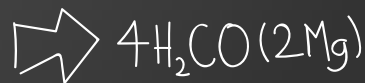
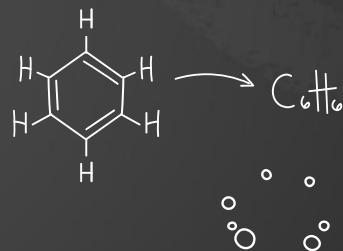
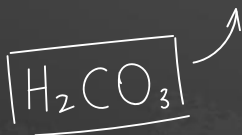
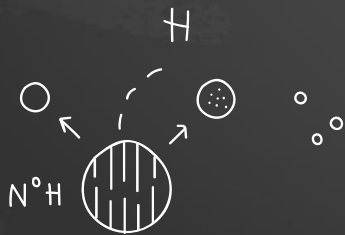
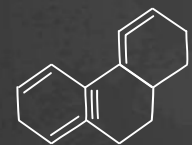




# Chemistry - 101

January 17



# Chemical reactions

In chemical reactions substances with certain compositions and properties turn into different substances with different compositions and properties BUT the nuclei of atoms DO NOT change.



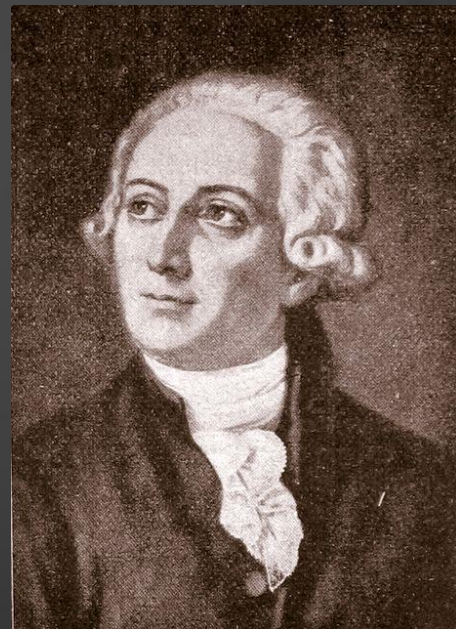
The oxidation state, which may be positive, negative or zero, is the hypothetical charge that an atom would have if all bonds to atoms of different elements were 100% ionic, with no covalent component.

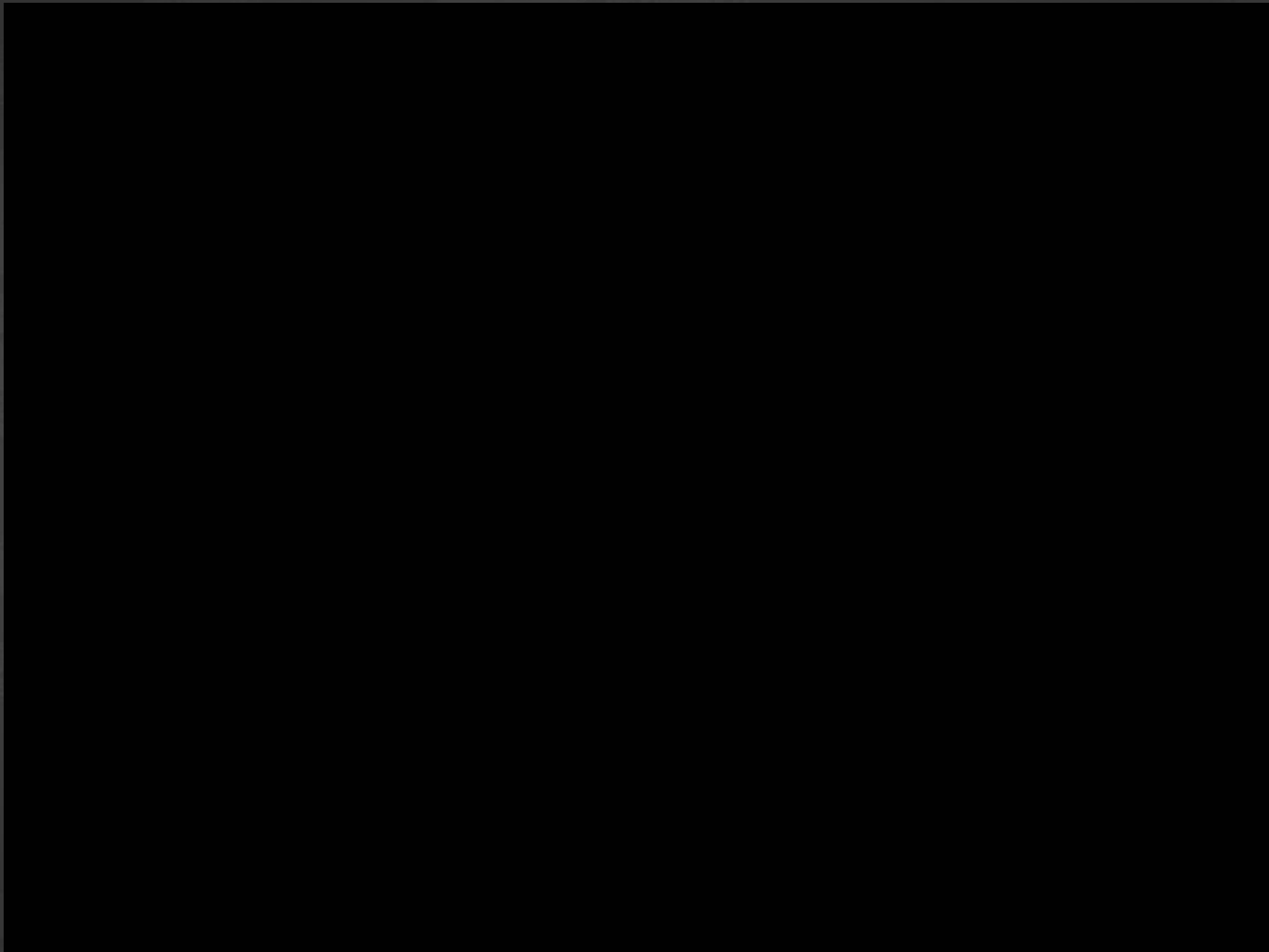
| Element | Electronegativity | Element | Electronegativity |
|---------|-------------------|---------|-------------------|
| Cs      | 0.79              | H       | 2.20              |
| K       | 0.82              | C       | 2.55              |
| Na      | 0.93              | S       | 2.58              |
| Li      | 0.98              | I       | 2.66              |
| Ca      | 1.00              | Br      | 2.96              |
| Mg      | 1.31              | N       | 3.04              |
| Be      | 1.57              | Cl      | 3.16              |
| Si      | 1.90              | O       | 3.44              |
| B       | 2.04              | F       | 3.98              |
| P       | 2.19              |         |                   |

# LOMONOSOV - LAVOISIER LAW



- The **Law of Conservation of Mass/Matter** (also known as the **Lomonosov-Lavoisier Law**) states that **mass** in a closed system will remain the same. Hence, **matter** cannot be created nor destroyed but can be rearranged.
- Mass of the reactants (substances that react) is equal to the mass of reaction products (substances that form in the reaction)





# Periodic table of the elements

group

1\*

period

1

1

H

2

He

3

Li

4

Be

11

Na

12

Mg

19

K

20

Ca

21

Sc

22

Ti

23

V

24

Cr

25

Mn

26

Fe

27

Co

28

Ni

29

Cu

30

Zn

31

Ga

32

Ge

33

As

34

Se

35

Br

36

Kr

37

Rb

38

Sr

39

Y

40

Zr

41

Nb

42

Mo

43

Tc

44

Ru

45

Rh

46

Pd

47

Ag

48

Cd

49

In

50

Sn

51

Sb

52

Te

53

I

54

Xe

55

Cs

56

Ba

57

La

72

Hf

73

Ta

74

W

75

Re

76

Os

77

Ir

78

Pt

79

Au

80

Hg

81

Tl

82

Pb

83

Bi

84

Po

85

At

86

Rn

87

Fr

88

Ra

89

Ac

104

Rf

105

Db

106

Sg

107

Bh

108

Hs

109

Mt

110

Ds

111

Rg

112

Cn

113

Nh

114

Fl

115

Mc

116

Lv

117

Ts

118

Og

3

4

5

6

7

8

9

10

11

12

13

14

15

16

17

58

Ce

59

Pr

60

Nd

61

Pm

62

Sm

63

Eu

64

Gd

65

Tb

66

Dy

67

Ho

68

Er

69

Tm

70

Yb

71

Lu

90

Th

91

Pa

92

U

93

Np

94

Pu

95

Am

96

Cm

97

Bk

98

Cf

99

Es

100

Fm

101

Md

102

No

103

Lr

Alkali metals

Alkaline-earth metals

Transition metals

Other metals

Other nonmetals

Halogens

Noble gases

Rare-earth elements (21, 39, 57–71) and lanthanoid elements (57–71 only)

Actinoid elements

\*Numbering system adopted by the International Union of Pure and Applied Chemistry (IUPAC).

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This class uses the materials from the following books:

Larry Gonick and Graig Criddle “The cartoon guide to chemistry”

Manyuilov and Rodionov “Chemistry for children and adults”

Kuzmenko, Eremin, Popkov “Beginnings of chemistry”

<http://school-collection.edu.ru> (experiments)