BCE++ Basis Grammer Rules

I. Elements

1.1 Element Symbol

All the characters of element symbols should be half-characters, capitalize the first letter, and other letters are lowercase.

Example:

Na	ATTENTION: 1. Capitalize the first letter, and other letters are lowercase. 2. Half-width characters.

Correct:

H	He	Li	Be	O	F	Ne

Wrong:

h	HE	li	bE	o	f	NE

1.2 Expressions of the number of atoms (Atom Descriptor)

After the element symbol, you can attach a positive integer as the number of selected atom of a element in a molecule, any negative numbers, decimals, fractions, or zero are not accepted. If you don't specify the number, it will be set to the default value 1.

Example:

C_{60}	ATTENTION: 1. Positive number suffix 2. The default suffix number is 1 if you don't specify.

Correct:

C60	Na2	H1	O3	P

Wrong:

C0	Na0.9	H1/2	F2.0	P-2

II. Molecule

2.1 Basic Molecular Formula

Several atomic descriptors together constitute a basic formula.

Example:

Na_2CO_3	ATTENTION: 1. Connected directly, no space, tab inside.

Correct:

KCl	CO_2	C_2H_4	H_2O	HCN

Wrong:

K Cl

2.2 Molecular Formula with Parentheses

Typically, you can use parentheses on the radical or group. You can also append a positive integer as coefficient(suffix). It descripts the number of repetitions of the content in the parentheses. A molecular formula with parentheses includes following four parts: Sub-expression on the left, expression in the parentheses, parentheses suffix and sub-expression on the right. As shown:

In these four parts, the sub-expression on the left and right, the expression in the parentheses should also compliant the rules in this document. So, nested parentheses is allowed. Another parentheses (such as '{}' and '[]') are also allowed.

Example:

$(CH_3)_2CHO$	ATTENTION: 1. The content in the parentheses should compliant the rules in the document.
$(CH_3)_2CHOOPF(CH_3)$	ATTENTION: 2. Multiple brackets may appear in the same expression
$[AB(CD)_3]_2E$	ATTENTION: 3. Matching parentheses.

Correct:

$Ca(CN)_2$	$Al_2(SO_4)_3$	$K_3Fe(CN)_6$	$(NH_4)_3(P(Mo_{12}O_{40}))$	$(NH_4)_2MoO_4$

Wrong:

$CaCN)_2$	$Al_2)SO_4(_3$	$K_3FeCN)_6$	$(NH_4)_3P(Mo_{12}O_{40}))$	$(NH_4)_0MoO_4$

2.3 Electric Charges and Ion

Positive charge (ne^+) can be written like:

(ne+)

Also, negative charage (ne^-) can also be written like:

(ne-)

When $n=1$, it can be ignored. If there is no grammatical ambiguity in the expression, the parentheses can be ignored. We don't suggest to do that.

Example:

$Cu(2e+)$ $Cu(e+)_2$	ATTENTION: 1. The atomic descriptor with a electric descriptor can descript a ion. ATTENTION: 2. All parentheses should compliant the rules in P2.2, so the 'Cu(e+)2' here equals to 'Cu(2e+)'.

Correct:

$NH_4(e+)$	$(e-)Cl$	$Fe(CN)_6(3e-)$

Wrong:

(e-2)	e+Na	Cle-

III Chemical Equation

Chemical equations consists of molecular formula, connectors (+、-、=). The basic chemical equation rules like following:

[Reactants 1] [+/-] [Reactants 2] … [Reactants N] = [Product 1] [+/-] [Product 2] … [Product N]

Example:

$Na_2CO_3+HCl=NaCl+H_2O+CO_2$

Correct:

$NH_3+CH_4+O_2=HCN+H_2O$	$Cl_2+H_2O_2=HCl+O_2$

$Cu(NO_3)_2+NO=Cu(NO_3)_2+NO+H_2O$	$XeF_2+OH(e^-)=Xe+O_2+F(e^-)+H_2O$
$NH_4CNO=CO(NH_2)_2$	$XeO_3+H_2O+Fe(2e+)=Xe+Fe(3e+)+OH(e^-)$
$Cu(2e+)+(e^-)=Cu$	$Na_2CO_3.2H_2O+H_2O=Na_2CO_3.10H_2O$
$Cl(e^-)-(e^-)=Cl_2$	$(NH_4)_2S_3+HCl=NH_4Cl+H_2S+S$

Wrong:

Cu-e-=Cu(2e+)
A=B