

FLOWCHART FOR DETERMINING Oxidation Number

Substance _____

Is it an Element?

→ Yes Oxidation Number (O.N.) = 0

No

Is it a Binary Ionic Compound

→ Yes O.N. = charge on ion
* O.N. has sign in front of number, charge has sign behind number.

No

Substance that share electrons

- Find Electronegativity of each element
- More Electronegative, it is "-" O.N.
- the number is number of the most common charge.

Yes

Polyatomic ion

Yes

Molecular compound

- The 2nd element, you need to do some math as shown here.

Summation of O.N. times subscript for each element in substance must equal either 0 or charge.

Summation of O.N. times subscript for each element = charge of ion
but = 0

Method A

- Break up into ions and deal with ions using above process

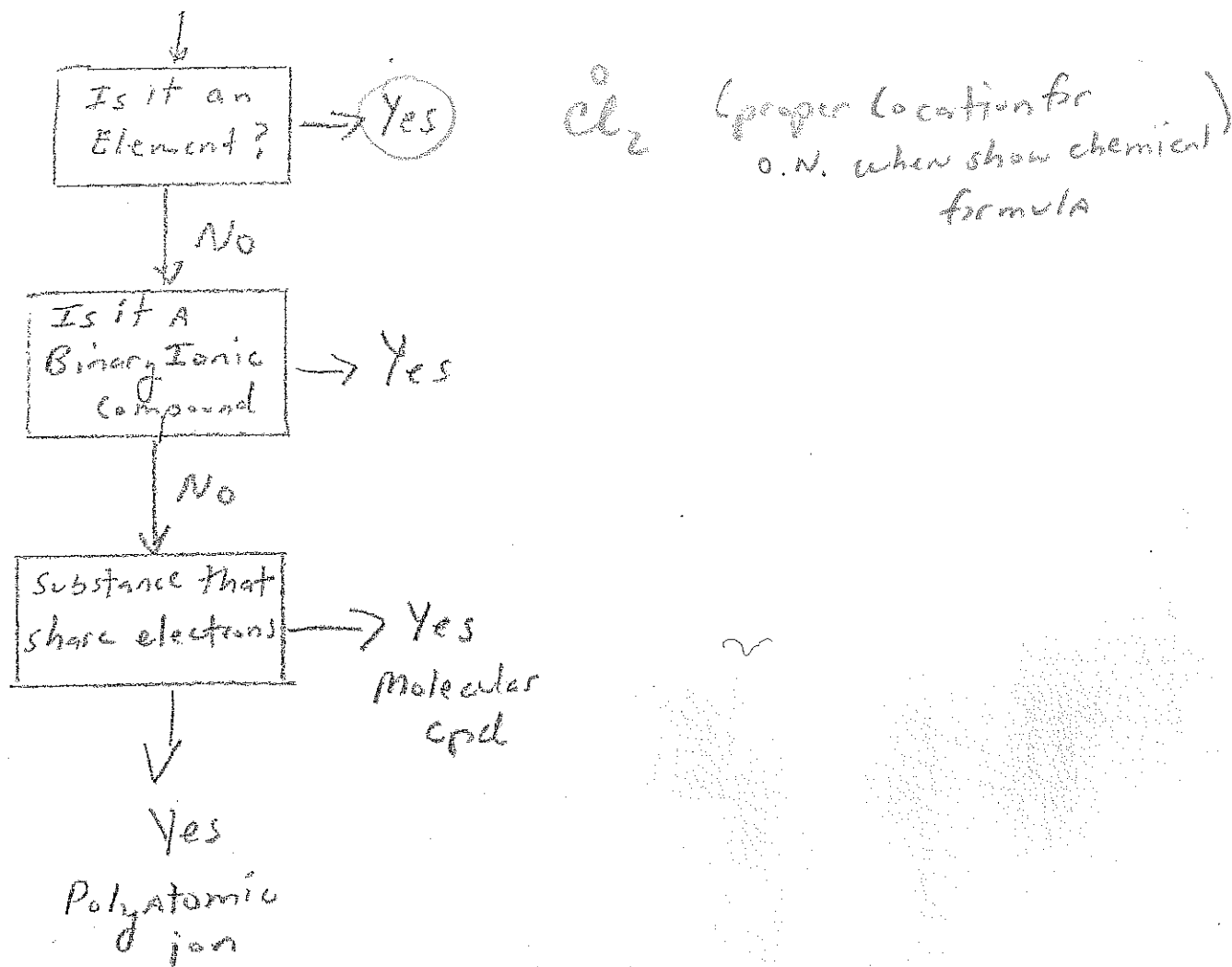
Special case Ionic Compd with polyatomic ion
Two different methods possible

Method B

- only works with 3 element compounds
- One element is Most E.N. "-" O.N.
- One element is Least E.N. "+" O.N.
- OTHER DO ABOVE MATH

Example of Flow chart for Determining O.N. (~~Blank~~)

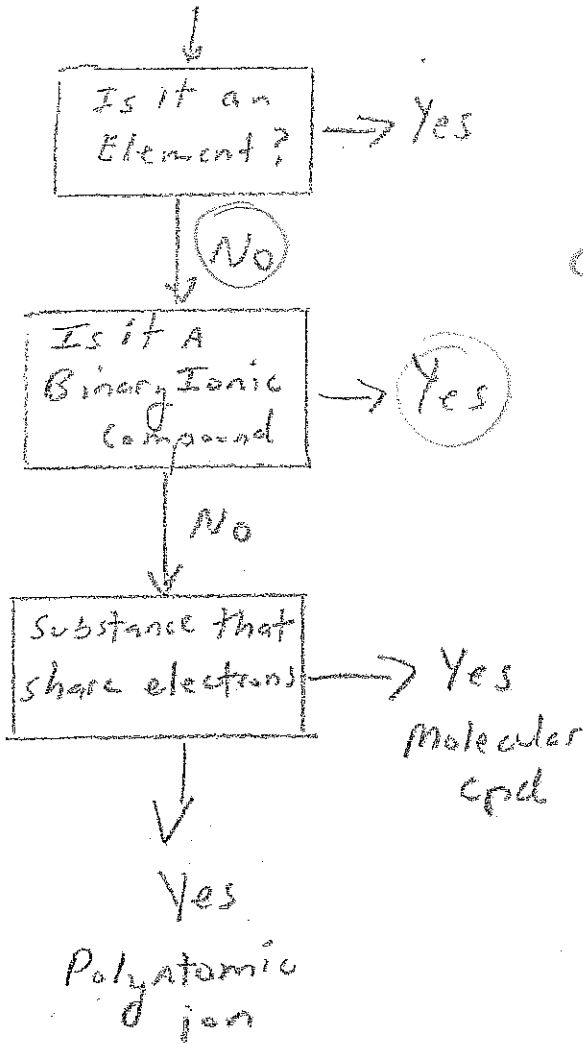
Substance Cl₂



Special case (Ionic comp with polyatomic ion)

Example of Flow chart for determining O.N. (Blank)
copy

Substance MgCl₂



O.N. = charge on each ion

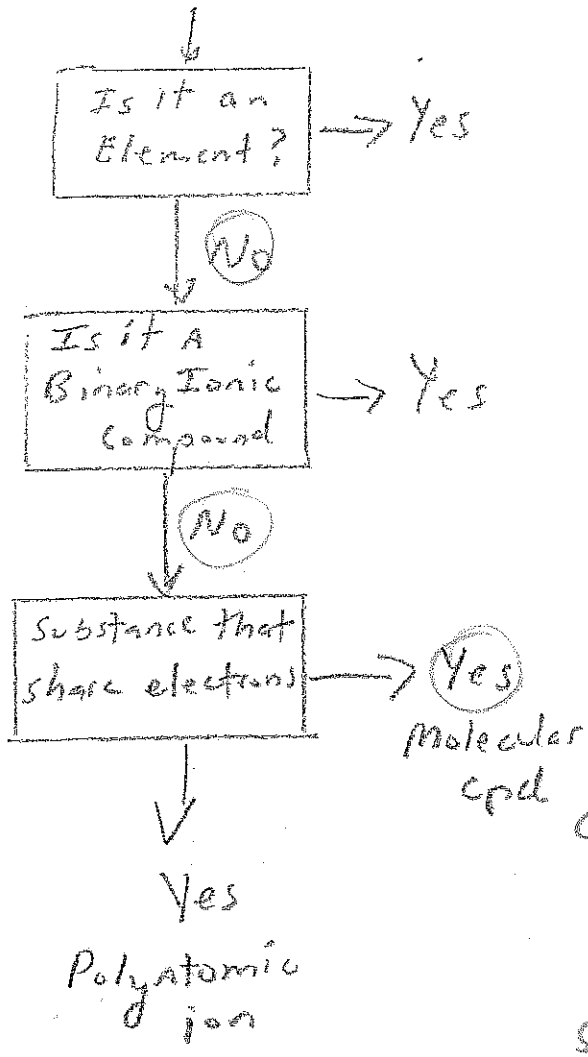


so $Mg^{+2} Cl^{-1}_2$ (remember O.N. "sign" then number)

Special case (Ionic cpd with polyatomic ions)

Example of Flow Chart for Determining O.N. (~~Blank~~)

Substance C₁O₂



E.N. = Electronegativity from Table (see webpage)

See General rules in Oxidation Number webpage for most common O.N.

	E.N.
C	2.5
O	3.5

so NO has O.N. = -2
C?

$$C_1O_2: 1(x) + 2(-2) = 0$$

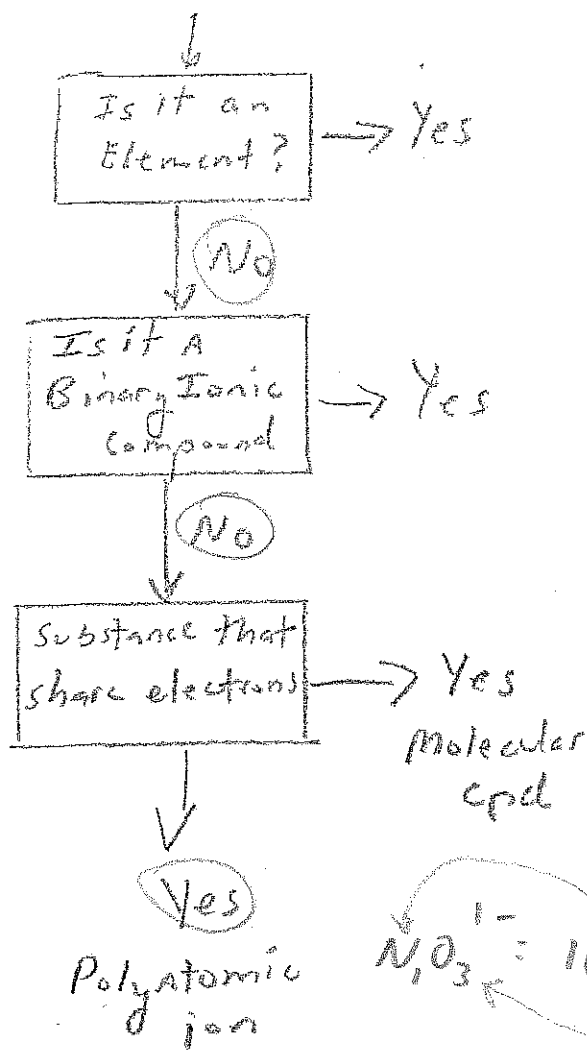
$x = +4$

so looks like $C_1^{+4}O_2^{-2}$

Special Case (Ionic cpd with polyatomic ions)

Example of Flow chart for Determining O.N. (~~Blank~~)

Substance NO_3^-



E.N. = Electronegativity from EN Table (see webpage)

	E.N.
N	3.0
O	3.5

See General rules in Oxidation Number webpage for most common O.N.
 so O has O.N. = -2
 Polyatomic ion's charge.

$$\text{NO}_3^- = 1(x) + 3(-2) = -1$$

$$x = +5$$

$$+5 \quad -2 \quad -1$$

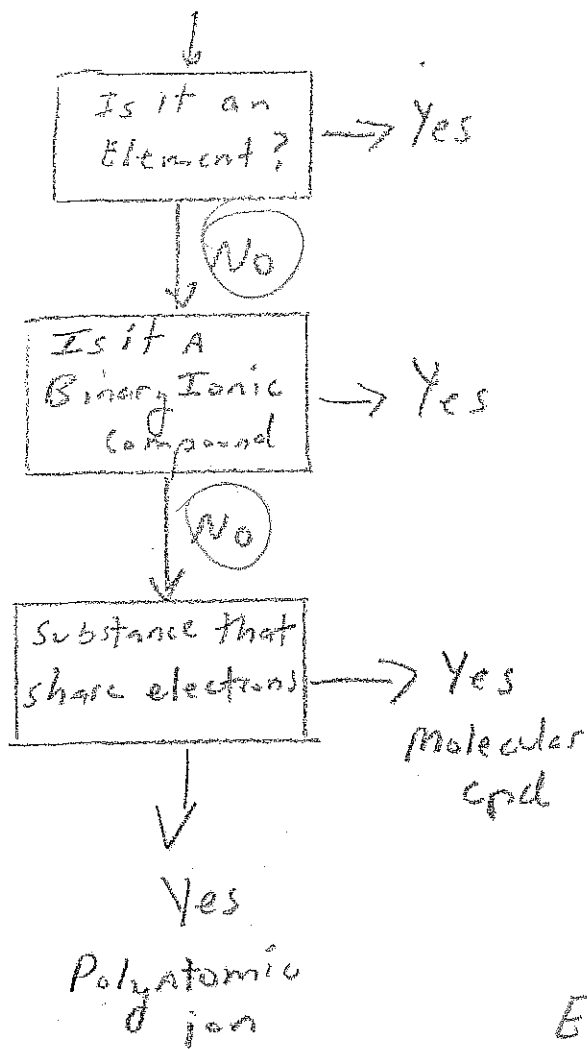
$$\text{N}_1\text{O}_3$$

so looks like

Special Case (Ionic cpd with polyatomic ion)

Example of Flow chart for determining O.N. (~~Blank~~)

Substance $\text{Ca}(\text{NO}_3)_2$



E.N. = Electronegativity from EN Table see webpage

Special Case (Ionic cpd with polyatomic ions)

Method A

Ions of $\text{Ca}(\text{NO}_3)_2$



O.N. = charge



	E.N.
Ca	1.0
N	3.0
O	3.5

so O has O.N. = -2

$$1(x) + 3(-2) = -1$$

$$x = +5$$

Method B

Ca: least EN, O.N. = +2

O: most EN, O.N. = -2

N: ?

$$1(+2) + 2(x) + 6(-2) = 0$$

$$+2 + 2x - 12 = 0$$

$$x = +5$$

