

Formal Charge, Oxidation number

1. Formal charges:

the charge of an atom in a Lewis structure which results if the bonding electrons are shared equally

formal charge of an atom in a Lewis structure = $V - L - 1/2P$

V: number of the valence electrons of the atom

L: number of lone pair electrons

P: number of the shared electrons

- the sum of all the formal charges in a molecule equals the total charge on the molecule
- helps to assess the stability of a resonance structure

2.0 Oxidation number:

the charge an atom would have if the more electronegative atom in a molecule would acquire both electrons in a bond

e.g. for a molecule A-B:

oxidation number of the more electronegative atom = $V - P - L$

oxidation number of the less electronegative atom = $V - L$

P: number of the shared electrons

L: number of the lone pair electrons

V: number of the valence electrons of the atom

3.0 Differences between formal charges and oxidation number

3.1 formal charges

- the bonding electrons are equally divided between the constituent atoms
(**homolytically shared bonding electrons**)

3.2 oxidation number

- bonding electrons are assigned to the more electronegative atom
(**heterolytically shared bonding electrons**)