

# ELECTROMAGNETIC MEANING OF GIBB'S FREE ENERGY, ELECTROLYSIS ,CELL REACTION AND BROWN GAS

HUNG – KUK OH

School of Mechanical and Industrial Engineering  
Ajou University Soowonsy Wonchondong San 5 442–749 South Korea

## ABSTRACT

Physical chemistry states that electric potential is due to Gibb's free energy from chemical reaction of the electric cell. However we have not the electromagnetic meaning of Gibb's free energy. The free energy is discovered to be a kinetic energy part of the rotating electromagnetic wave ( $\pi$ -ray), which is different from conventional Coulomb attraction energy and can anticipate that there is a current difference between before and after the electric load. This paper manipulates the relationship between  $\pi$ -rays (Gibb's free energy) and electrolysis, cell reaction and Brown gas reaction.

## 1. CRYSTALLIZING $\pi$ -BONDING AND ALTERNATING MAGNETIC FIELD

The crystallizing  $\pi$ -bonding is a resonance bonding of even number of

atoms, between which one electron has a going and returning motion as in Fig.1.

The electron produces an alternating magnetic field and two rotating electromagnetic waves ( $\pi$ -rays) because an electromagnetic wave in an alternating magnetic field becomes rotated, as in Fig.2. If any resonant electromagnetic wave enters in the alternating magnetic field, it becomes rotated (Ref.1, Ref.2, Ref.3) as like Brown gas burning.

The physical processes of the elementary particles inside the nucleus in the case of the crystallizing  $\pi$ -bonding are as in Fig.3. The crystallizing  $\pi$ -bonding (Ref.4, Ref.5) produces two  $\pi$ -rays of one wave length during the electron's going and receiving trip between two protons and makes an electron, a positron, a neutrino and an antineutrino disappear at the end of the trip as in Fig.3. During the electron's receiving trip the two  $\pi$ -rays of one wave length finishes to produce. The two  $\pi$ -rays of one wave length are supplied and absorbed to the proton. The  $\pi$ °

mesons produce implosion bonding between proton and neutron in this case. There are four kinds of  $\pi$ -bondings between the protons, closed  $\pi$ -bonding, open  $\pi$ -bonding, covalent  $\pi$ -bonding and ferromagnetic  $\pi$ -bonding. The closed  $\pi$ -bonding makes the protons fixed and only one electron moves between two protons of the attended ones. They are even numbers. It produces two  $\pi$ -rays during the going and returning trip. Conventional metallic bonding belongs to this bonding.

The open  $\pi$ -bonding is an instantaneous bonding between two protons. The one of the two protons supplies an electron. It produces  $\pi$ -rays and then disbands soon after. The signal transduction of the neuron belongs to this one.

The covalent  $\pi$ -bonding makes two electrons move between two protons and does not produce  $\pi$ -rays because the produced alternating magnetic fields annihilate each other.

It belongs to conventional covalent bonding. The ferromagnetic  $\pi$ -bonding makes electrons circulate towards only one direction via the closed  $\pi$ -bonding protons and then produces magnetic moment. But it does not produce  $\pi$ -rays. Conventional van der Waals bonding corresponds to the open  $\pi$ -bonding and the conventional hydrogen bonding also belongs to the open  $\pi$ -bonding. Conventional ionic bonding gives electrons to the other atom.

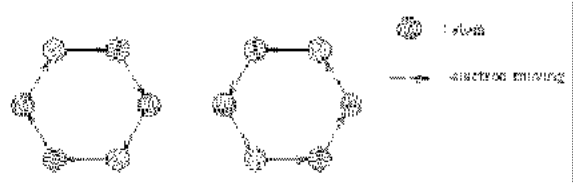


Fig.1 Closed  $\pi$ -bonding (Resonance Bonding)

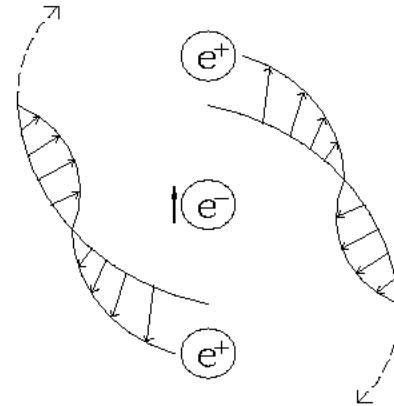


Fig.2 Producing of Two  $\pi$ -far Infrared Rays During the Electron's Going and Returning Trip

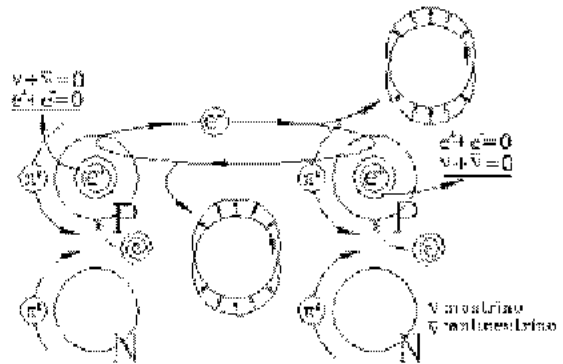


Fig.3 Crystallizing  $\pi$ -bonding

## 2. ROTATING ELECTROMAGNETIC WAVE ( $\pi$ -RAY) AND GIBB'S FREE ENERGY

In view of thermodynamics if the infrared rays are put under resonant alternating magnetic field they become rotated as

follows (Ref.6).

$$h\nu = h\nu\left(1 - \frac{r_0}{r}\right) + h\nu\left(\frac{r_0}{r}\right) \quad (1)$$

Where  $h$ : Plank constant

$\nu$ : frequency of infrared ray

$2\pi r_0$ : wave length of the infrared ray

$r$ : radius of the rotating infrared ray

If the equation (1) is expressed into the thermodynamic terms,

$$H = G + TS \quad (2)$$

, where  $H$ : enthalpy ( $h\nu$ )

$G$ : Gibb's free energy

$(h\nu(1 - \frac{r_0}{r}))$  or kinetic energy of the ray

$TS$ : dissipated energy in free space or potential energy in the alternating magnetic field.

The Gibb's free energy is the driving kinetic energy for the electric flow.

### 2-1 ABSORPTION OF $\pi$ -RAY AND ELECTROLYSIS

Each atom is enclosed with  $\pi$ -rays, which were produced by the alternating magnetic field that is made by the electron's going and returning between atoms as in Fig.1.

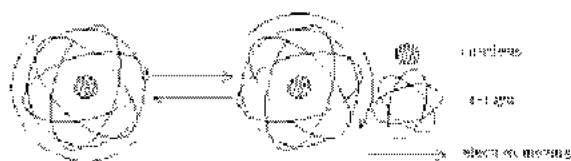


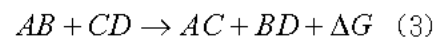
Fig.1. nucleus and  $\pi$ -rays in an atom

If some resonant  $\pi$ -rays are supplied to and suppress the fencing  $\pi$ -rays, the

bonding will be broken because the equilibrium distance for the electron moving between atoms can not be maintained. Electrolysis process supplies  $\pi$ -rays of Gibb's free energy to the reactant atoms and then the component atoms are divided into and are induced to both electric poles.

### 2-2. PRODUCTION OF $\pi$ -RAYS AND CELL REACTION

Electric cell produces Gibb's free energy between two poles by their chemical reactions. For example



By the change of the equilibrium distances for the electrons' moving between atoms some remaining  $\pi$ -rays (Gibb's free energy) can be produced as in Fig.2.

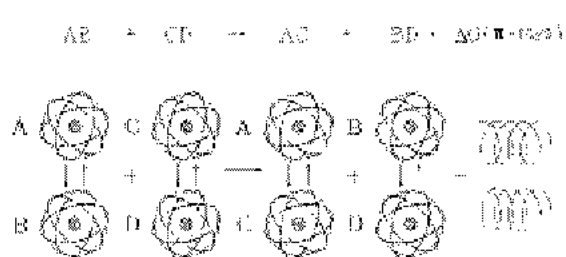


Fig.2 Production of  $\pi$ -rays by Chemical Reaction in Electric Cell

Table of Standard Electric Pole Potentials shows the sequence of the oxidants and reductants and suggests the possibility of the cell reactions (Ref.6).

### 2-3. ENVIRONMENTAL IMPROVING REACTION AND BROWN GAS

Brown gas is produced when water ( $H_2O$ ) is electrolyzed without separation membrane.

Hydrogen atoms and oxygen ones are mixed in atomic states as in Fig.3.

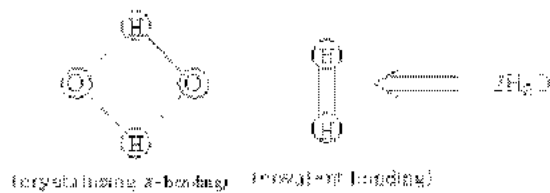


Fig.2. Mixture of Hydrogen and Oxygen atoms after  $H_2O$  electrolysis without separation membrane

Brown gas is very safe in an mixture state without explosion because of the crystallizing  $\pi$ -bonding of hydrogen atoms and oxygen ones (Ref.7).

The atoms of the crystallizing  $\pi$ -bonding absorb more  $\pi$ -rays than the atoms of covalent bonding, which needs more electric energy than the conventional water electrolysis and provokes more current reduction during the electrolysis.

When Brown gas is burned much  $\pi$ -rays are generated because of the alternating magnetic fields due to the crystallizing  $\pi$ -bondings. The generated  $\pi$ -rays can induce chemical reactions. If Brown gas applies in any airpollutional smokes of environmental reactions, any harmful gases (CO, NO, etc) can be ceased to be produced.

### 3.CONCLUSION

- ① Crystallizing  $\pi$ -bonding produces rotating electromagnetic waves ( $\pi$ -rays) and generates alternating magnetic field.
- ② Gibb' s free energy is a kinetic energy part of the  $\pi$ -ray total energy.
- ③  $\pi$ -ray loses its potential energy in free space, which is absorbed to any space of alternating magnetic (electric) field (or any planet).
- ④ Electrolysis is an absorption process of the electric  $\pi$ -rays to the component atoms.
- ⑤ Electric cell reaction is a production process of  $\pi$ -rays (Gibb' s free energy) by chemical reaction by a change of the equilibrium distances for the electrons' moving between atoms.
- ⑥ If brown gas applies in any airpollutional smokes of environmental reactions, any harmful gases (CO, NO, etc) can be ceased to be produced.

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