

Quantized Liquid Water Molecule Deposited Energy

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Abstract: Respecting zero water molecule enthalpy of transformation and double-surface geometry the temperature dependent quantized liquid water molecule deposited energies are calculated. The highest deposited energy yielding 2.77 eV is found to emerge at body temperature of 36.4°C being at second decimal place equal to that emerging at 0°C. Of biological interest are also the other temperatures belonging to the quantized deposited energies coinciding with the growth rate of bacteria.

Keywords: Orbital energy and orbit length, double-surface geometry, zero enthalpy of transformation, water molecule contraction and extension, energy transmitter and receiver, deposited and raised energy, body temperature, growth rate of bacteria

1. PREFACE

Previously the deposited energy was introduced to explain the difference between the transmitted and the received energy during the orbital energy exchange at the zero water molecule enthalpy of transformation in the case of the bent gaseous [1] as well as the tetrahedral solid water molecule [2]. In the present paper the deposited energies of liquid water molecule from 0°C to 100°C are the subject of interest.

2. THE WATER MOLECULE DEPOSITED ENERGY

The deposited energy is the difference between transmitted and received orbital energy during the orbital energy of transformation:

$$E_{deposited} = E_{transmitted} - E_{received}. \quad (1)$$

At the zero water enthalpy of contraction two bound Hydrogen electrons are the transmitter and four non-bound Oxygen electrons are the receiver of the orbital energy. Per one transmitted quantum of energy holds:

$$E_{deposited}^{contraction} = E_{transmitted} - 2 \times E_{received}. \quad (2a)$$

Expressed in the electron orbit length of the transmitter s_H and the receiver s_O we have:

$$\frac{E_{deposited}^{contraction}}{Ry \times \alpha^{-1}} = \left(\frac{1}{s_{H \text{ bound}}^{successor}} - \frac{1}{s_{H \text{ bound}}^{predecessor}} \right) - 2 \left(\frac{1}{s_{O \text{ non-bound}}^{predecessor}} - \frac{1}{s_{O \text{ non-bound}}^{successor}} \right). \quad (2b)$$

Where $Ry = 13.605 \ 693 \ 009 \ \text{eV}$ and $\alpha^{-1} = 137.035 \ 999 \ 139 \ \lambda_e$.

At the zero water enthalpy of extension four non-bound Oxygen electrons are the transmitter and two bound Hydrogen electrons are the receiver of the orbital energy. Per one transmitted quantum of energy now holds:

$$E_{deposited}^{extension} = E_{transmitted} - 0.5 \times E_{received}. \quad (3a)$$

And expressed in the electron orbit length of the transmitter s_O and the receiver s_H we have:

$$\frac{E_{deposited}^{extension}}{Ry \times \alpha^{-1}} = \left(\frac{1}{s_{O \text{ non-bound}}^{successor}} - \frac{1}{s_{O \text{ non-bound}}^{predecessor}} \right) - 0.5 \left(\frac{1}{s_{H \text{ bound}}^{predecessor}} - \frac{1}{s_{H \text{ bound}}^{successor}} \right). \quad (3b)$$

At the step by step process only the electron jumping to adjacent orbit is allowed. In the event that the transmitted energy is insufficient to raise the receiver up to the higher orbit, all the transferred energy becomes the deposited energy. The number of steps of energy transmission is finite since energy receiver can receive only limited amount of energy so that the potential energy of the concerned

electron does not exceed the maximal, i.e. zero value. Or with other words, the final potential energy of the electron being the energy receiver should not become positive and at the same time the final orbit length of that electron should not become negative. Thus:

$$E_{deposited}^{whole} = \sum_{\substack{s(n) \in \mathbb{R}^- \\ s(n) \in \mathbb{R}^+}} E_{deposited}(s(n)). \tag{4}$$

Here s_n is the average elliptic-hyperbolic orbit length of the energy receiver which enables a stable circulation of that electron on the orbit satisfying the double-surface geometry relation as follows:

$$s(n) = n \left(2 - \frac{1}{\sqrt{1 + \frac{\pi^2}{n^2}}} \right), \quad n \in \mathbb{N}. \tag{5}$$

Where n is the elliptic length of the electron orbit expressed in Compton wavelengths of the electron representing also the orbit number or name. In the case of forming twice longer subtle orbit the electron original orbit can possess half value $n/2$, too.

The deposited energy is given back to the transmitter when the reverse process of the contraction as well as the extension from the extreme to the initial position takes place.

Since the contraction and the extension are in principle equally probable processes the average value of both deposited energies makes sense:

$$E_{deposited}^{average} = \frac{\sum E_{deposited}^{contraction} + \sum E_{deposited}^{extension}}{2}. \tag{6}$$

3. THE TEMPERATURE INTERVAL OF INITIAL ORBITS

Let us propose that in the liquid water the initial orbit length of bound Hydrogen electrons and non-bound Oxygen electrons is of temperature dependent and lie between that of the ice [2] and steam [1]. Then for the initial non-bound Oxygen electron orbit length holds the next temperature interpolation expressed in Celsius degrees:

$$s_o = s(121) + \frac{s(123) - s(121)}{100^\circ C} \times T = 121.040\ 763 + 0.019\ 993 \times \frac{T}{^\circ C}. \tag{7}$$

And for the initial bound Hydrogen electron orbit length we have:

$$s_H = s(103.5) - \frac{s(103.5) - s(98)}{100^\circ C} \times T = 103.547\ 646 - 0.054\ 973 \times \frac{T}{^\circ C}. \tag{8}$$

Three initial non-bound Oxygen electron orbit lengths from s_o (121) to s_o (123) and thirteen initial bound Hydrogen electron orbit lengths from s_H (103.5) to s_H (98) then occupy the next temperature intervals as presented in the Table1:

Table1. Temperature intervals of initial non-bound Oxygen and bound Hydrogen electron orbits

Temperature interval T(°C)	Initial non-bound Oxygen electron orbit number n_o	Initial non-bound Oxygen electron orbit length $s(n_o)$	Initial bound Hydrogen electron orbit number n_H	Initial bound Hydrogen electron orbit length $s(n_H)$
$\geq 100,0$	123	123.0401...	98	98.0503...
90.9–100.0	122	122.0404...	98.5	98.5501...
81.8–90.9	122	122.0404...	99	99.0498...
72.7–81.8	122	122.0404...	99.5	99.5496...
63.6–72.7	122	122.0404...	100	100.0493...
54.5–63.6	122	122.0404...	100.5	100.5491...
50.0–54.5	122	122.0404...	101	101.0488...
45.5–50.0	121	121.0408...	101	101.0488...
36.4–45.5	121	121.0408...	101.5	101.5486...
27.3–36.4	121	121.0408...	102	102.0483...
18.2–27.3	121	121.0408...	102.5	102.5481...
9.1–18.2	121	121.0408...	103	103.0479...
0.0–9.1	121	121.0408...	103.5	103.5476...

4. THE TEMPERATURE INTERVAL OF DEPOSITED ENERGIES

With the help of equations in section 2 and data in Table 1 the temperature dependent liquid water molecule deposited energies are given. The results of calculations - note also [1], [2] - are collected in Table 2 and presented in Figure 1.

Table2. Temperature intervals of liquid water molecule deposited energies

Temperature interval T(°C)	$E_{contraction}(eV)$	$E_{extension}(eV)$	$E_{average}(eV)$	By size ranked deposited energy
$\geq 100,0$	2.74127	2.18537	2.46332	12
90.9 – 100.0	2.82015	2.43924	2.62970	7
81.8 – 90.9	2.75736	2.12892	2.44314	13
72.7 – 81.8	2.97869	2.22089	2.59979	9
63.6 – 72.7	3.08620	2.29044	2.68832	3
54.5 – 63.6	3.00821	2.33603	2.66914	6
50.0 – 54.5	2.94355	2.00150	2.47252	11
45.5 – 50.0	3.13376	2.22141	2.67759	4
36.4 – 45.5	3.25418	2.28628	2.77023	1
27.3 – 36.4	3.22412	1.92987	2.57700	10
18.2 – 27.3	3.34366	1.98854	2.66610	8
9.1 – 18.2	3.31271	2.03154	2.67213	5
0.0 – 9.1	3.43141	2.10421	2.76781	2

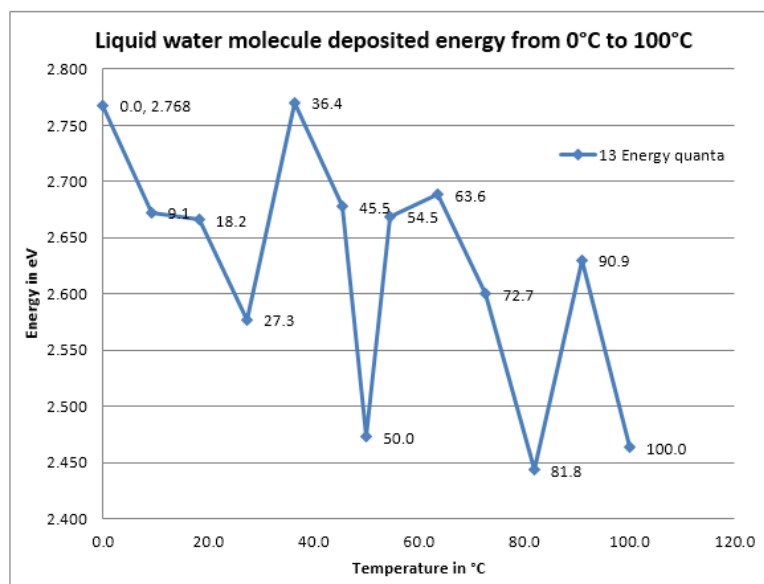


Figure1. Quantized Liquid Water Molecule Deposited Energy

We can see that the average deposited energy of liquid water molecule is changing up and down in the temperature scale from 0°C to 100°C. The highest value of 2.770 eV is achieved at the body temperature 36.4 °C. This energy is for only 0.002 eV higher than the average deposited energy found at 0°C as follows:

$$E_{deposited}^{average}(37.4^{\circ}C) - E_{deposited}^{average}(0^{\circ}C) = 2.770 eV - 2.768 eV = 0.002 eV. \quad [9]$$

The smallest value of 2.463 eV is achieved at 100°C [1]. So the maximal difference of liquid water molecule average deposited energies yields:

$$maximal \Delta E_{deposited}^{average} = E_{deposited}^{average}(37.4^{\circ}C) - E_{deposited}^{average}(100^{\circ}C) = 0.307 eV. \quad [10]$$

The above value is comparable to the previously given result of 7kcal/mole known as the energy currency or coin of the biological cell. [2]

Interesting are also four maximal and four minimal values of the average deposited energies in the temperature scale from 9.1°C to 100°C presented in Figure 1. They coincide with the maximum and minimum growth rate of bacteria as is shown in Figure 2 obtained from the reference [3]:

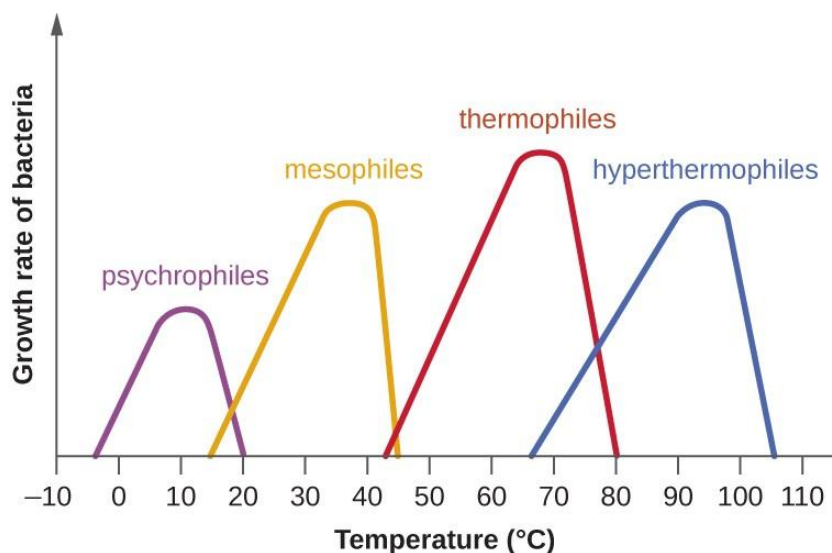


Figure2. *The growth rate of bacteria as a function of temperature [3]*

The curves are skewed toward the optimum temperature. [3] The skewing of the growth curve is thought to reflect the rapid denaturation of proteins as the temperature rises past the optimum for growth of the microorganism. [3] Therefore in accordance with the similarity of Picture 1 and Picture 2 one can expect the involvement of water molecule deposited energy in the vital biological processes. The role of water molecule can be explained by the nature of deposited energy as a more flexible part of the orbital energy with consequently prosperous catalytic properties. This means that the deposited energy can be taken away by the surrounding molecules for a short time during the closure of the water molecule bank and be reimbursed quickly enough before reopening the treasure. So no one sees the places.

5. INSTEAD OF CONCLUSIONS

Coincidences are a part of art, not of science. But a scientist needs the art to be able to make science.

ACKNOWLEDGEMENT

Thanks God for the Living Water

DEDICATION

This fragment is dedicated to The Church of Mary the Queen, also known as the Pilgrimage Church of the Assumption of Mary, or Our Lady of the Lake, located on a small island in Lake Bled, known as Blejski Otok, in the picturesque Julian Alps of north-western Slovenia.

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Citation: *Janez Špringer, "Quantized Liquid Water Molecule Deposited Energy", International Journal of Advanced Research in Physical Science (IJARPS), vol. 5, no. 9, pp. 32-35, 2018.*

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