International Journal of Latest Research in Science and Technology ISSN (Online):2278-5299
Volume 5, Issue 6: Page No.14-16, November-December 2016
https://www.mnkpublication.com/journal/ijlrst/index.php

TEMPERATURE IS THE PARAMETER OF THE STRUCTURAL AND ENERGY STATE OF SYSTEM

B. Utelbayev[*1], E.Suleimenov[1], A.Utelbayeva[2]
[*1]Chemical Engineering, Kazakh-British Technical University, Almaty, Kazakhstan
b.utelbayev@mail.ru[1]
[2]Testing laboratory "Advanced materials and technology", Kazakh-British Technical University, Almaty, Kazakhstan
metallaim@mail.ru[2]
[3]South Kazakhstan State University named after M.Auezov, Shymkent, Kazakhstan
b.utelbayev@mail.ru[3]

***Abstract* - This article reveals the physical meaning of the concept "temperature" and describes the nature of the carriers of heat. Calculated the value of energy carrying by "teplotron" and its relationship with temperature.**

Keywords: Energy, "Chemical Individual, Partiles, "Electron, Photon, "Teplotron", light, heat.

I. INTRODUCTION

The concept of temperature is widely used in scientific research, physical, biological, chemical-technological processes and in various fields of daily life, however, there is no scientifically basis explanation of its real nature. In molecular-kinetic theory it is assumed that the temperature of the medium is proportional to the kinetic energy of the particles in the system and is a parameter characterizing the degree of heating of the body being in thermal equilibrium with the environment. Along with this, there are many definitions of temperature, for example, in the distribution of Boltzmann, is often used as the "temperature excitation" and in the distribution of Maxwell – "kinetic" , in Stefan-Boltzmann's law –"radiation temperature" [1, 2]. Thus, for the system which is in thermodynamic equilibrium, all these parameters are equal to each other, and they are referred to simply as "temperature of the system" [4, 5]. Raises a lot of questions the mechanism of heat transfer from one material object to another, there is no specific relationship between the temperature and vectors for heat. In this context, the author [6] emphasizes:"Sometimes, unfortunately, and still talking about "thermal energy" of the body. Hotter body has a greater margin of "thermal energy" than the cold, and can transmit the last part of it to establish thermal equilibrium. But what does mean the kind of "heat energy"? What is its nature? What does it represent carrier of heat? This article discloses the physical meaning of the concept "temperature" shows the nature of the carriers of heat and establish a new point of view on the concept of "energy".

II. DISCUSSION

In works [7, 8] it is noted that the physical meaning of temperature remains mysterious because "elementary carrier of thermal energy – the photon exists in the framework of the Unity Axiom, and scientists trying to reveal the electromagnetic structure and to describe the behaviour using theories that work beyond the scope of this axiom. In accordance with the theory, working in the framework of the Unity Axiom, the radius of rotation of the electromagnetic structure of a photon, varying in the range remains equal to the wavelength, which describes its centre of mass". The author for the explanation of the meaning of temperature gives examples of the variation of the maximum blackbody radiation temperature and wavelength, which is described by Wine's law [9] in the form:

$$\lambda = b/T$$

where λ is the wavelength at maximum intensity, T – temperature, K, the coefficient b, called Wine's constant and equal 0,002898 m•K. Here, the author wonders about the wavelength of photons, the totality of which forms the maximum temperature, and notes: "Modern science has no precise answer to this question. We can only assume that the temperature is formed only those photons which are radiated by electrons at synthesis of atoms and molecules". We believe that the merit of the author is the proposal that carriers of heat are elementary discrete particles (in the author's opinion it is photon". However, the impression that a collection of photons with a specific wavelength generates temperature and is not disclosed the essence of temperature. In addition, in this work no relationship of temperature with the heat and the heat transfer mechanism. Experimentally determined temperature is a comparative value relative to the extensive properties of the system adopted for the initial measurement standard or reference point. Therefore, the notion of temperature, we encounter at first glance seems very simple value, but in fact it is a complex parameter, characterizing the state of the system at the same time at micro and macro levels. In this relationship, suggested by us, a new elementary particle of heat "teplotron" [10, 11, 12, 13] brings clarity to the concept of "heat transfer" and allows considering the parallel processes at micro and macro levels. When considering the properties of substances at the macro level, as a rule, there are numerous difficulties with the interpretation of microobjects that due to the lack of understanding and concrete ideas about the microobjects. In

Publication History
Manuscript Received : 22 November 2016
Manuscript Accepted : 28 November 2016
Revision Received : 10 December 2016
Manuscript Published : 31 December 2016

turn, the micro-objects are elements of macro-objects. This leads to incomplete understanding of the processes occurring in the macro-objects. Meanwhile, micro-macro properties of substances occur simultaneously and combined quantitative - qualitative characteristics: the magnitude of the internal energy, temperature, number of moles, constant of Planck, Boltzmann, etc. At the same time, the temperature, the value of which is estimated by comparing the extensive properties of the measuring instruments is considered to be the result of the random motion of molecules, as claimed in statistical physics. And also from the basic equations of molecular kinetic theory, absolute temperature, or temperature on the Kelvin scale is a quantitative measure of the average kinetic energy (ε) of chaotic movements of molecules and is determined by the formula:

$$\varepsilon = 1{,}5\ k\cdot T$$

where $k=1{,}38\cdot10^{-23}$ J/K – Boltzmann's constant, which is the conversion factor between the units of absolute temperature and the units of kinetic energy. In modern scientific literature the laws of the micro-objects are explained by the quantum theory [14]. One of the characteristic features of quantum theory having no analogue in classical physics is the quantization of energy stable systems. It is the feature - quantization of energy is one of the key principles necessary for the understanding of the structural organization of matter, i.e. the existence of a stable, recurring in its properties the "chemical individuals" [15] and submicrostructure units, which compose substance and the formation of "electromagnetic particles" in the process [16, 17]. From the point of view of quantum theory, the electromagnetic wave consists of particles called photons, and therefore property of matter such as radiation is realized by particles. In this regard, Planck in 1900 had made the assumption that electromagnetic radiation is emitted in separate portions of energy (quantum), the magnitude of which is related to the frequency (v) of radiation by following expression:

$$\varepsilon = hv$$

The coefficient of proportionality "h" is known as Planck's constant. In this equation the frequency "v" is the frequency of change of values of poles of the alternating current and is related to the cyclic frequency "ω" which is experimentally determined by Hertz [18], using the source of high voltage pulses of quickly changing current . The change of cyclic frequency i.e., the change in EMF as a function of time represents a sine wave. And wavelengths of sine waves do not describe the nature of movement and the nature of the emitted photons or "electromagnetic particles". Here it is necessary to accept that a change in the frequency values of the poles and the values of EMF of the AC is the result of process. Well-known, the process causes the transfer of energy. Therefore the frequency values of change of poles and the values of EMF of the AC are related to the process and cause the formation of "electromagnetic particles" in the microstructure of "chemical individual". The nature of collective motions of elementary particles manifested in the form of heat, light, "electromagnetic waves" [17]. All these physical-chemical manifestations are forms of energy transfer. According to the M. Faraday's postulate on the similarity of the energy manifestations in different material systems, the assumption that heat is transferred by "electromagnetic particles" such as "teplotron" [10, 11, 12, 13] cannot raise objections. On the basis of reference data, we calculated the mass of "teplotron" - $5{,}280\cdot10^{-36}$kg. In exothermic processes, heat is proportional to the number of "teplotron", which explicitly manifests itself in the phenomenon of the mass defect of nuclei. It is well known that the binding energy of the atomic nucleus is the difference between the energy of the protons and neutrons in the nucleus and their energy in the free state. From the law of conservation of energy and mass implies that the formation of nucleus from its constituent nucleons should be allocated to the energy equivalent of the mass change is expressed by the known formula:

$$\Delta E = \Delta mc^2$$

where, Δm- is the reduction of the total mass of all nucleons in the formation of the nucleus, c - is the speed of light. This change in mass corresponds to 8, $98755\cdot10^{16}$J of heat, i.e., the set of elementary particles with a mass of 1kg [19]. Using these reference data, the calculated mass of the elementary particles of the heat carrier "teplotron" - $5{,}280\cdot10^{-36}$ kg. On this given value is calculated the energy of one "teplotron". We define the contents of the number of teplotron in 1kg mass corresponding to 8, $98755\cdot10^{16}$J of energy:

$$1\text{kg}/5{,}280\cdot10^{-36}\text{kg} = 0{,}\ 18939\cdot10^{36}\ \text{particles;}$$

The thermal energy corresponding to one of the "teplotron":

$$8{,}98755\cdot10^{16}\text{J}\ /0{,}18939\cdot10^{36}\ \text{particles} = 4{,}745\cdot10^{-19}\text{J}$$

We in [12] based on thermodynamic calculations of the combustion of hydrogen is found that 114, 4 $\cdot10^{3}$J of heat is dissipated into the environment, which corresponds to the formation of 0.4 mole of water. Calculate the value of thermal energy per structural unit of an elementary particle:

$$114{,}4\cdot10^{3}/(0{,}4\cdot6{,}02\cdot10^{23}) = 4{,}750\cdot10^{-19}\text{J}$$

Perfect match the value of thermal energy on one structural unit calculated by two different methods indicates the identity of the carriers of heat. It should be noted that the energy transfer in the system take place when the system is exposed by forces from outside [16, 17]. Elementary particles in stationary conditions are in equilibrium with particles of the environment and "chemical individuals" are structurally and energy compliance to their inherent physical - chemical properties of the system. Under the influence of energy from outside, which impacts to the structural-energy state of the "chemical individual," at the process transfer of particles between objects occurs transmission of «energy." This explanation stems from the following circumstances:

- flows in a straight line spread "pulsating elementary particles" in a variety of mediums to create a wave phenomenon. And, as a result, it can cause interference, and diffraction;
- "ripple particles" can be seen as a basic "standing wave", which is understood as de-Broglie's waves. According to the Planck's equation ε **= hv** and from the calculated energy values of the "teplotron" $4{,}745\cdot10^{-19}$ and $4{,}750\cdot10^{-19}$J easy to calculate the frequency of the ripple:

$$v = \varepsilon/h = 4{,}745\cdot10^{-19}/6{,}626\cdot10^{-34} = 7{,}161\cdot10^{14}\text{Hz}$$
$$v = \varepsilon/h = 4{,}750\cdot10^{-19}/6{,}626\cdot10^{-34} = 7{,}168\cdot10^{14}\text{Hz}$$

These values refer to frequencies of optical photons that suggest the presence of "teplotron" in their composition.

- Characteristic temperature - "Debye temperature $\theta = h\nu_{max}/k$ in the numerator is the expression $h\nu_{max}$ represents the quantum energy associated with the frequency, i.e. the frequency of "pulsating" elementary particles;

-"pulsating particles" at spreading in various media can create compel running "electromagnetic wave" in the environment.

The nature of the movement of elementary particles manifests itself in the form of light, heat, electromagnetic waves. Thus, energy characteristics of the system describing by "temperature" is directly dependent on the concentration of "teplotron" in a material object. The relationship between temperature and the number of "teplotron" can be expressed in directly proportional dependence [20]:

$$\mathbf{T = k \cdot n}$$

where T - thermodynamic temperature (K), characterizes the concentration of "teplotron" in the Kelvin scale;

k - molar coefficient of proportionality characterizing the temperature change per unit heat (K·mol)/J] and is the reciprocal of the molar heat capacity of a substance;

n - heat portable unit of quantity of "teplotron", J/mol. Therefore, temperature is a quantitative characterisation and the criterion of direction of flow "teplotron", i.e. "heat". From this point of view, the entropy is a function of the structural - energy state of a system depends on temperature. Since the temperature, pressure and volume are related by the equation PV/T= const the change of any parameter status entails various energy manifestations. We restrict ourselves to the temperature. The temperature increase is the result of increasing the concentration of "teplotron", and the equalization of temperature between material objects is the process of uniform distribution of concentration "teplotron", i.e. the establishment of structure - energy compliance in the system characterized by entropy.

III. CONCLUSION

Any calculation by the classical equations of thermodynamics and molecular-kinetic theories by specifying all parameters of the equation lead to the unequivocal conclusion: carriers of "heat" are "teplotron". The mass of one "teplotron" is $5{,}280 \cdot 10^{-36}$kg; his energy $4{,}750 \cdot 10^{-19}$J and "pulsing frequency" $7{,}168 \cdot 10^{14}$Hz. Temperature characterizes the structural - energy state of the system with the corresponding entropy. The nature of the motion of elementary and "pulsating particles" creates the form and the mechanism of energy transfer between material objects. The system temperature depends on the concentration of "talamanov". The dependence of heat (Q), internal energy (U) work (W), temperature (T), heat capacity (c), entropy (S) etc. describes the well-known equations of thermodynamics:

$$\mathbf{Q = cm\Delta t \qquad Q = U + W, \qquad \Delta S = Q/T}$$

$$\mathbf{\Delta S = c \ln(T2/T1)}$$

Energy is a conceptual expression describing quantitatively and qualitatively the motion of particles (substances) in a process where the form of its transfer depends on the properties of elementary particles.

IV. CONCLUSION

Although a conclusion may review the main points of the paper, do not replicate the abstract as the conclusion. A conclusion might elaborate on the importance of the work or suggest applications and extensions. Authors are strongly encouraged not to call out multiple figures or tables in the conclusion—these should be referenced in the body of the paper.

V. REFERENCES

[1] Sivukhin DV. General course of physics. Thermodynamics and molecular physics,Vol. 2, Moscow: Nauka, 1990. – 591p.Russian.

[2] Landau LD, Lifshitz EM. Static physics.Part1.- 5th ed..- M.:Fizmatlit.2005.-616p. Russian.

[3] Planck M. FAV. works. Moscow:Nauka. 1975, Russian.

[4] Physics. Big encyclopaedic dictionary/ GL. Edited by A. M. Prokhorov. — M.: Great Russian encyclopedia, 1998. p. 741., p 944 p. Russian.

[5] Physical Chemistry/Ed. by KS. Krasnov.-M.: Higher school. 1982,687p. Russian

[6] Seleznev Y. "Basic elementary physics", Publishing house "SCIENCE", Main editorial Board for physical and mathematical literature, Moscow, 1966. Russian

[7] Kanarev FM. The Beginning of the Physical Chemistry of the Microcosm. 9th ed. 1000p. Russian.

[8] Kanarev FM. Theoretical foundations of physical chemistry of the microcosm. 2nd edition. Krasnodar. 2008. 675p. Russian.

[9] https://ru.wikipedia.org/wiki/. Russian.

[10] Utelbayev BT,Suleimenov EN,Utelbayeva AB. The Hypothesis about Heat Transfer and Nature of its Carrier //PONTE. Florence, Italy, International Scientific Researches Journal .Vol.72.No.2.Feb.2016,pp.18-25.

[11] Utelbayev BT, Suleimenov EN, Utelbaeva AB. Interconnection of Heat and Mass Changes of the Reacting Substances at Physical and Chemical Transformations. //J. Chem.Bio. and Phy. Sci. April 2015;Vol.5, No. 2; 1783-1790.

[12] Utelbayev BT,Suleimenov EN,Utelbayeva AB. Heat transfer between material objects.//Science and the World. 2015 vol. 1 No. 2(18) pp. 39-43. Russian

[13] Utelbayev BT,Suleimenov EN,Utelbaeva AB. The Influence of External Impact in the Transfer of Energy between Material Objects//International Journal of Scientific Research in Science and Technology.Vol.2.Issue5, ISSN Print:2395-6011.PP.241-245

[14] https://ido.tsu.ru/schools/physmat/data/res/SPF/uchpos/text/2_3.html

[15] Utelbayev B, Suleimenov E, UtelbayevaA, Zhanabay N. Some Concepts about Substance,Chemical compound and an Element.// American Chemical Science Journal. 2014.4(2)PP.166-73

[16] Utelbayev BT, Suleimenov EN, Utelbayeva AB. The effects of changing structural and energy compliance in the structure of material objects// Science and world. 2016. No. 8 (36). Vol. I. PP.12-16 Russian.

[17] Utelbayev BT, Suleimenov EN., Utelbayeva AB. The nature of the motion of elementary particles and forms of energy transfer// Science and world. 2016. No. 9 (37). Vol. I. PP.32-35 Russian.

[18] https://edu.severodvinsk.ru/after_school/nit/2006/web/shemakina/opit.html

[19] Quick reference physical-chemical variables./Edited by A.Ravdel and A.Ponamereva. L.:Chemistry, 1983.- 232p. Russian

[20] Utelbaev BT., Suleimenov EN. Utelbaeva AB. Temperature and energy transfer between material objects.//The scientific heritage (Budapest, Hungary) Vol. 1, No 2 (2) (2016) | # CHEMICAL SCIENCES # of PP.100-104. Russian.