International Journal of Advanced Research in Physical Science (IJARPS)
Volume 10, Issue 12, 2023, PP 4-5
ISSN No. (Online) 2349-7882
www.arcjournals.org

Subtle Bond of Hydrogen Molecule

Cankarjevacesta 2, 9250 GornjaRadgona, Slovenia, EU

***Corresponding Author:** ***Janez Špringer,** *Cankarjeva cesta 2, 9250 Gornja Radgona, Slovenia, EU*

Abstract: *Subtle bond of hydrogenmolecule is presented.*

Keywords: *Hydrogen, potassium channel*

1. Introduction

Hydrogen molecule consists of two atomson the distance of 74.14 pm[1] as shown in Figure 1:

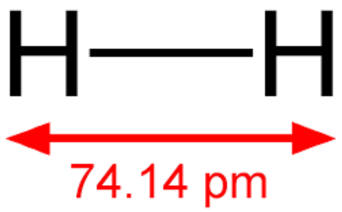

Figure1. *The hydrogen molecule*

Applyinggiven data and taking into account wave restrictions the subtle bond on the double surface could be proposedusingthe formulathatin units of Compton wavelengths of the electron relates the length on the elliptic surface $n$to the length on the average elliptic-hyperbolic surface $s(n)$ as follows[2]:

$$s(n) = n\left(2 - \frac{1}{\sqrt{1+\frac{\pi^2}{n^2}}}\right). \tag{1}$$

2. Subtle Bonding Orbit between Hydrogen Atoms Hin Hydrogen MoleculeH_2

The measured distance between hydrogen atoms Hin the hydrogen molecule H_2 is $d_{HH} = 74.14\, pm = 30{,}558\,\lambda_e$[1].The orbit lengths$_{HH} = 95{,}997\,\lambda_e$ is πtimes longer curved distance. It is close to the geometrically stableorbit length $s(96\,\lambda_e) = 96.051\,\lambda_e$.(1)Andthe doubled orbit length $2s_{HH} = 191{,}993\,\lambda_e$ is close to the geometrically stable doubled orbit length $2s(192\,\lambda_e) = 192.015\,\lambda_e$(1). So, it shows that the stable subtle bonding orbit HH between hydrogen atomsH in hydrogen molecule$H_2$is easily formed.

3. Subtle Anti-Bonding Orbits between Hydrogen AtomsH in Hydrogen Molecule H_2

The stable subtle bonding orbit between hydrogen atoms of elliptic length $n_{HH} = 96\,\lambda_e$can be divided to twoequal stablesubtle anti-bonding orbits of elliptic length$\frac{n_{HH}}{2} = 48\,\lambda_e$. We just have to take into account that subtle anti-bonding orbits are energetically less favourable thanit is the bonding orbit so the input of energy is needed for their formation[2]:

$$\Delta E_{forming}^{anti-bonding} = Ry.\alpha^{-1}\left(-\frac{1}{s\left(\frac{n_{HH}}{2}\right)} + \frac{1}{\frac{s(n_{HH})}{2}}\right). \tag{2a}$$

Then applying $Ry = 13.605\,693\,009\,eV$ as well as $\alpha^{-1} = 137.035\,999\,146$ and inserting needed data the next result is given:

$$\Delta E_{forming}^{anti-bonding} = 0{,}061\,981\,636\,eV \;\; corresponding\ to \;\; 14{,}987\,093\,01\ \text{THz}. \tag{2b}$$

4. Coincidentally Equal Values

a) Simulations by Alonso et al. gave the adsorption energy of the H_2 molecule on a graphitic surface of less than 0.10 eV, in agreement with the experimental value of 0.062 eV reported by Brown et al. [3]

b) And electric field with 15 THz offersa welcome frequencythatimproves the potassium ion flux through the voltage-gated potassium channelsby 67.7%[4] to ensurecontinuedsuccessful communication between cells.

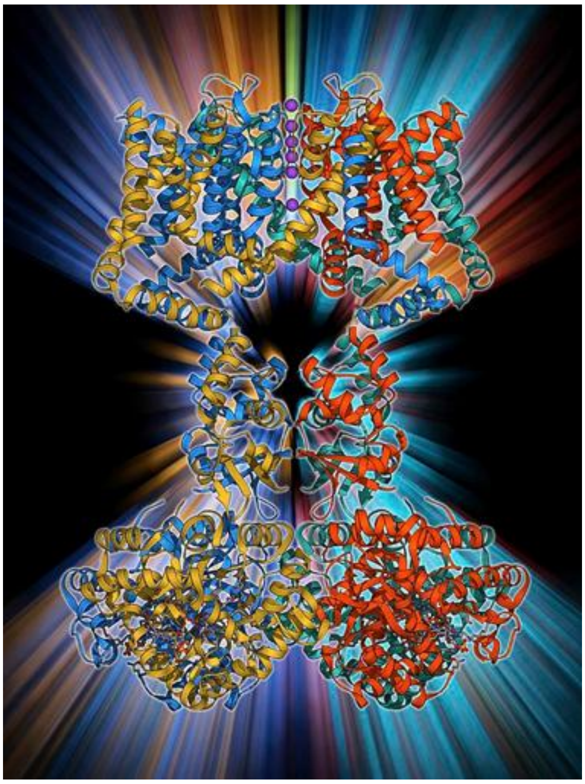

Figure2. *Voltage gated potassium channel [5]*

5. Conclusion

Merry Christmas and Happy New year 2024

References

[1] CCCBDB listing of experimental geometry data page 2 (nist.gov). Retrieved December 2023

[2] Janez Špringer (2023) "Geometry of Ozone Molecule " International Journal of Advanced

Research in Physical Science (IJARPS) 10(12), pp.1-3, 2023.

[3] Shixun Bai, Mohammad Piri, Hydrogen storage in nanoporous media: Molecular dynamics simulations of the confinement effects,International Journal of Hydrogen Energy,Volume 47, Issue 59,2022, Pages 24886-24896

[4] Ding W, Zhao X, Wang H, Wang Y, Liu Y, Gong L, Lin S, Liu C, Li Y. EffectofTerahertzElectromagneticField on thePermeabilityofPotassiumChannel Kv1.2. Int J Mol Sci. 2023 Jun 17;24(12):10271. doi: 10.3390/ijms241210271. PMID: 37373419; PMCID: PMC10299135.

[5] https://sciencephotogallery.com/featured/voltage-gated-potassium-channel-laguna-design.html

Citation: *Janez Špringer (2023) "Subtle Bond of Hydrogen Molecule " International Journal of Advanced Research in Physical Science (IJARPS) 10(12), pp.4-5, 2023.*