Hosted by Ankara University

Journal of Nuclear Sciences

p-ISSN: 2147-7736, e-ISSN:2148-3981

Journal homepage: http:// jns.ankara.edu.tr

DOI: 10.1501/nuclear.2023.54

Theoretical Molecular Mechanism and Long-Life of SARS-CoV-2 on the Phone Screen: Electronegativity Between Crystal Liquid Atoms and SARS-CoV-2 Spike Protein

V. M. Beluli[1,2*], E. Daku[3]

ORCID: 0000-0003-1234-6888, 0000-0002-2051-0580

[1]University of Tirana, Faculty of Natural Sciences, Department of Industrial Chemistry, Tirana, Albania
[2]University of Mitrovica "Isa Boletini", Faculty of Food Technology, Department of Technology, Mitrovica, Kosovo
[3]University Clinical Centre of Kosovo Clinic of Anesthesiology and Intensive Care, Faculty of Medicine, Prishtina, Kosovo

Received 07.02.2021; received in revised form 04.01.2022; accepted 28.02.2022

ABSTRACT

The world has been recently attacked by a global pandemic of SARS-CoV-2 virus, which is one of the most problematic and challenging viruses for global health. Still many mechanisms of SARS-CoV-2 are not well understood from experimental medicine perspective. Identifying sources of SARS-CoV-2 infection is extremely important to reduce the effects of the pandemic around the globe. Researchers have built a scientific mechanism for the lifespan of the SARS-CoV-2 virus accomodated on a mobile phone screen. SARS-CoV-2 has a powerful ability to stay on the screen for 28 days at a temperature of 20°C and we have shown that the reason why SARS-CoV-2 has this long-life on the screen is due to Nitrogen (N) atoms in crystalline liquid (4-Cyano-4'-pentylbiphenyl) as well as atoms of Nitrogen (N), Carbon (C) and Hydrogen (H) in SARS-CoV-2Spike. The effect of electronegativity occurs between N of the crystalline liquid and C, H and N in Spike and this enables the virus to have a long-life, so electronegativity plays a key role in the non-dissociation of SARS-CoV-2 from the phone screen.

Keywords: SARS-CoV-2 virus, Molecular mechanism, Crystalline liquid (4-Cyano-4'-pentylbiphenyl), Phone screen, Electronegativity

1. Introduction

The World Health Organization (WHO) declared the COVID-19 outbreak as a global pandemic on 11 March 2020 [1]. In November 2019, the novel severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), which causes the coronavirus disease 2019 (COVID-19), was detected in Wuhan, China [2]. Evidences suggest that COVID-19 might have been present in China, Europe and, in the United States (US) much earlier than January 2020 [3].

SARS-CoV-2 has spread worldwide, infecting more than 70 million people and caused more than 1.6 million deaths as of early December 2020 [4]. The researches have put forward that SARS-CoV-2 was transmitted faster and more efficiently compared to the other two epidemic coronaviruses SARS-CoV and MERS-CoV [5]. To control and prevent disease transmission, many

*Corresponding author.
E-mail address: valdrin_beluli@hotmail.com, (V. M. Beluli)
Journal of Nuclear Sciences, Vol. 7, No. 2, December 2020, 16-19

ISSN: 2148-7736

countries have implemented mass quarantine measures [6].

Most people infected with the COVID-19 virus are expected to experience mild to moderate respiratory illness and recover without requiring special treatment [7]. Several studies have described the clinical features due to COVID-19: flu-like symptoms, and pulmonary complications [8,9].

In modern society, there is an increasing demand for healthy lifestyles, which many people make efforts to achieve [10]. These social norms are often communicated implicitly through social and cultural practices, or explicitly through media communications and other sources [11,12]. As a result of the COVID-19, there has been an increasing interest in developing innovative methods for the public [13,14]. The use of smartphones to obtain information about the pandemic and frequent telephone communication can transmit the virus rapidly if the phone screens are not properly sterilized. In this scientific research, we have tried to understand why the SARS-CoV-2 virus can stay on the phone screen glass at the temperature of 20°C for 28 days that can cause public health problems, see Fig. 1.

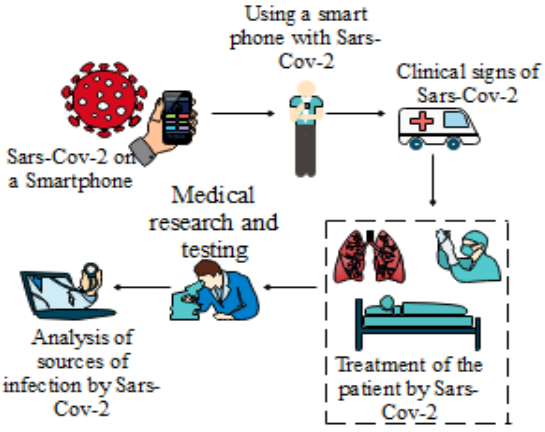

Fig.1 *Transmission of SARS-CoV-2 virus from smart phone screens as a negative impact on public health*

Survival rates of SARS-CoV-2 were determined at different temperatures, half-lives of between 1.7 and 2.7 days were obtained at 20°C, and the virus was isolated for up to 28 days at 20 °C from common surfaces such as glass [15]. Firstly, we began to study the layers of smartphones and based specifically on the properties of those atoms that possess the highest electronegativity in the SARS-CoV-2 virus and the electronegativity of the atoms that are present in the chemical material 4-Cyano-4 '-pentylbiphenyl in the screen of smartphones etc.

2. Methods

The Liquid Crystal in Smart Phone Which Causes Long-Life SARS-CoV-2 in Screen Phone

4-Cyano-4'-pentylbiphenyl is a commonly used nematic liquid crystal (C18H19N). and it is known as 5CB [16,17]. This type of compound gives anability to attract SARS-CoV-2 Spike through electronegativity. Nitrogen (N) has electronegativity 3.04, Carbon (C) 2.55 and Hydrogen (H) 2.2. Based on the theory of electronegativity, it is known that the atom with the highest electronegativity attracts the density of the electron cloud of the other atom. In the case of our scientific research, we have three issues of electron attraction from electronegativity which are: N-N, N-C, N-H. Electronegativity arises from the liquid crystal (4-Cyano-4'-pentylbiphenyl) which passes through many layers of the smartphone screen, see Fig.2.

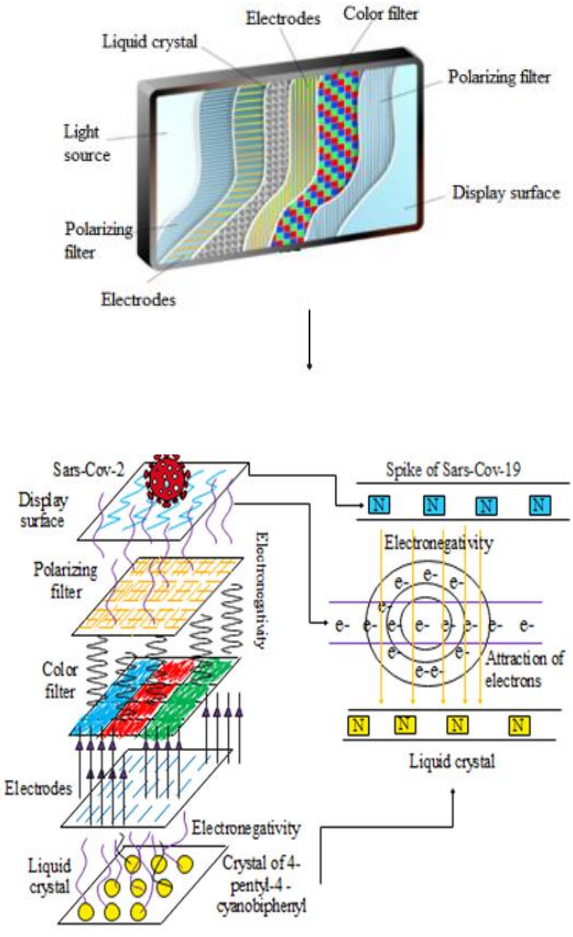

Fig.2 *Electronegativity and SARS-CoV-2 on the phone screen 16 [phone screen layers]*

The Key Question in Long-life of the SARS-CoV-2 on smartphones

What is the reason for the longevity of SARS-CoV-2 in smartphones and the impact of electronegativity of crystalline liquid?

SARS-CoV-2 has recently been the center of scientific community and the goal is to get back to a normal. Identifying the sources of the infection with SARS-CoV-2 is extremely important because a large number of infections from this virus can be prevented and many lives can be saved through medical advice. Today, it is difficult to explain some mechanisms why SARS-CoV-2 has a long stay in some materials, such as smartphones. Corona has an ability to stay on a phone screen for 28 days and this may lead to be infected unless it is sterilized We have investigated the possible mechanism why SARS-CoV-2 has a high possibility of surviving on a phone screen.

Each phone screen contains many electronic layers to convey a clear message on the phone screen. The most important layer inside the phone screen is the crystalline liquid of 4-Cyano-4'-pentylbiphenyl. This type of chemical compound contains the nitrogen atom and from the studies of quantum chemistry we know that nitrogen has a high electronegativity, so it attracts more electron cloud densities than some other atoms. Nitrogen electronegativity has a strong potential to attract other atoms to the SARS-CoV-2 Spike. The electrons from the Nitrogen atom in the crystal liquid of the telephone screen is attracted to remove electrons from Carbon (C) and Hydrogen (H) atoms.There is also the attraction of electron density from two nitrogen atoms (N-N) in which creates an interaction of the two-sided forces of the electrons that forms cycles of electron rotation between Spike and crystalline liquid, see Fig. 3.

3. Conclusion

SARS-CoV-2 as a global pandemic has caused many deaths worldwide as a result of which many individuals do not possess good knowledge to know where the sources of SARS-CoV-2 infections come from. Virologists have carried out much research to find the sources of infection with this virus and most of them have been scientifically proven and have helped a lot to create the conditions for health care.

SARS-CoV-2 as a virus has a long-life of 28 days on the glass surface at 20°C. It is known that phone screens are made of glass and this can be assumed as a source of infection as smartphone today is one of the most used technological devices. During our study we investigated the main mechanism why SARS-CoV-2 has a high long-life on the screen of smartphones. We have concluded that the electronegativity of crystalline liquid (4-Cyano-4'-pentylbiphenyl) is the main reason that attracts the electrons of the Nitrogen (N), Carbon (C) and Hydrogen (H) atoms. The nitrogen atom in the crystalline liquid (4-Cyano-4'-pentylbiphenyl) has good properties for

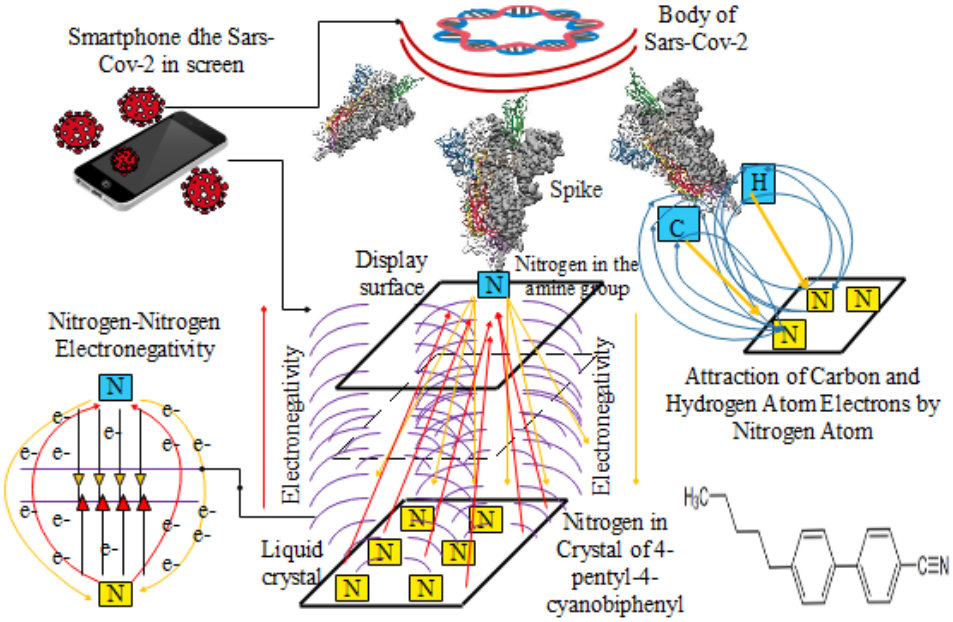

Fig. 3 *The crossing of electronegativity through the layers of the telephone screen and the attraction of electrons from the electronegativity in Spike of SARS-CoV-2*

attracting electrons of C, H and N atoms to the SARS-CoV-2 Spike. The electronegativity of N atoms in the crystalline liquid is the main cause that attracts electrons to other atoms allowing the SARS-CoV-2 Spike protein to be captured or retained on the telephone screen. This is the most consistent theory we have been able to research and study now for this previously unresolved problem.

Conflict of Interest

The authors have no conflict of interest.

References

[1] H.M.M. Taqi, H.N. Ahmed, S. Paul, M. Garshasbi, S.M. Ali, G. Kabir, S.K. Paul, "Strategies to Manage the Impacts of the COVID-19 Pandemic in the Supply Chain: Implications for Improving Economic and Social Sustainability", Sustainability 12(22):9483 (2020).

[2] H. Rossinot, R. Fantin, J. Venne, "Behavioral Changes During COVID-19 Confinement in France: A Web-Based Study", International Journal of Environmental Research and Public Health 17(22):8444 (2020).

[3] L.M. de-Oliveira-Pinto, V.E. Fiestas Solórzano, M. D.L.Martins, C. Fernandes-Santos, P.H. Damasco, M.A.M.T. de Siqueira, H.G. Dias, A. Pauvolid-Corrêa, P.V. Damasco, E.L. de Azeredo, "Comparative Analysis of Circulating Levels of SARS-CoV-2 Antibodies and Inflammatory Mediators in Healthcare Workers and COVID-19 Patients", Viruses 14(3):455 (2022).

[4] R.S. Baric, "Emergence of a Highly Fit SARS-CoV-2 Variant", New England Journal of Medicine 383(27):2684-2686 (2020).

[5] L.R. Lukowsky, C. Der-Martirosian, W.N. Steers, K.S. Kamble, A. Dobalian, "Using an Administrative and Clinical Database to Determine the Early Spread of COVID-19 at the US Department of Veterans Affairs during the Beginning of the 2019–2020 Flu Season: A Retrospective Longitudinal Study", Viruses 14(2):200 (2022).

[6] M. Cusinato, S. Iannattone, A. Spoto, M. Poli, C. Moretti, M. Gatta, M. Miscioscia, "Stress, Resilience, and Well-Being in Italian Children and Their Parents during the COVID-19 Pandemic", International Journal of Environmental Research and Public Health, 17(22) (2020).

[7] World Health Organisation (WHO). Coronavirus. https://www.who.int/health-topics/coronavirus#tab tab_1 (2020).

[8] F. Zhou, T. Yu, R. Du, G. Fan, Y. Liu, Z. Liu, J. Xiang, Y. Wang, B. Song, X. Gu, L. Guan, Y. Wei, H. Li, X. Wu, J. Xu, S. Tu, Y. Zhang, H. Chen, B. Cao, "Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: A retrospective cohort study", The Lancet 395(10229):1054–1062 (2020).

[9] M. Luigetti, G. Frisullo. "Clinical Health Care during the COVID-19 Pandemic", Journal of Clinical Medicine 9(11):3559 (2020).

[10] Y.J. Kim, E.S. Kim, "Relationship between Phobic Anxiety in Work and Leisure Activity Situations, and Optimistic Bias Associated with COVID-19 among South Koreans", International Journal of Environmental Research and Public Health 17(22):8436 (2020).

[11] M.A. Hogg, S.A. Reid, "Social identity, self-categorization, and the communication of group norms", Communication Theory 16:7–30 (2006).

[12] J. McAlaney, M.B. Almourad, G. Powell, R. Ali "Perceptions and Misperceptions of Smartphone Use: Applying the Social Norms Approach", Information 11(11):513 (2020).

[13] K.H. Grantz, H.R. Meredith, D.A.T. Cummings, C.J.E. Metcalf, B.T. Grenfell, J.R. Giles, S. Mehta, S. Solomon, A. Labrique, N. Kishore, C.O. Buckee, A. Wesolowski, "The use of mobile phone data to inform analysis of COVID-19 pandemic epidemiology", Nature Communicaton 11(1):1-8, (2020).

[14] C.O. Buckee, S. Balsari, J. Chan, M. Crosas, F. Dominici, U. Gasser, Y.H. Grad, B. Grenfell, M.E. Halloran, M.U.G. Kraemer, M. Lipsitch, C.J.E. Metcalf, L.A. Meyers, T.A. Perkins, M. Santillana, S.V. Scarpino, C. Viboud, A. Wesolowski, A. Schroeder, "Aggregated mobility data could help fight COVID-19", Science368(6487): 145–146 (2020).

[15] S. Riddell, S. Goldie, A.A. Hill, D. Eagles, T.W. Drew, "The effect of temperature on persistence of SARS-CoV-2 on common surfaces", Virology Journal 17(1):1-7 (2020).

[16] G.W. Gray, K.J. Harrison, J.A. Nash, "New family of nematic liquid crystals for displays", Electronics Letters 9(6):130–131 (1973).

[17] P.J. Collings, M. Hird, G.W. Gray, J.W. Goodby, A. Fukuda (eds.). "Introduction to Liquid Crystals: Chemistry and Physics", Taylor and Francis, New York (1997).