C0r0n@ 2 Inspect

Review and analysis of scientific articles related to experimental techniques and methods used in vaccines against c0r0n@v|rus, evidence, damage, hypotheses, opinions and challenges.

Thursday, July 15, 2021

Graphene oxide quantum dots based memristors

Reference
Yan, X .; Zhang, L .; Chen, H .; Li, X .; Wang, J .; Liu, Q .; Zhou, P. (2018). Graphene oxide quantum dots based memristors with progressive conduction tuning for artificial synaptic learning. Advanced Functional Materials, 28 (40), 1803728.
https://doi.org/10.1002/adfm.201803728

Introduction

1. Before beginning the analysis of the article by (Yan, X.; Zhang, L.; Chen, H.; Li, X.; Wang, J.; Liu, Q.; Zhou, P. 2018), which is entitled " Graphene oxide quantum dots based memristors"It is essential to know the concept of" memristor ". A memristor is an electrical component that takes its name from the words" memory "and" resistor ", first devised in 1971 by the electrical and computer engineer Dr. Leon Ong Chua from the Massachusetts Institute of Technology. According to their approach, the memristor is capable of relating the electric charge and the magnetic flux, defining it as a resistance with memory. The concept was later demonstrated by Richard Stanley Williams (researcher at HP Labs), when it is presented a useful physical model at the nanoscale (Strukov, DB; Snider, GS; Stewart, DR; Williams, RS 2008) In fact, this is so because ionic and electronic transport is feasible on a molecular and even atomic scale. applications of memristors are very diverse, for example,they would allow the expansion of the capacities of hard drives, reducing energy use and improving the speed of reading and writing (Di Ventra, M.; Pershin, YV 2013).

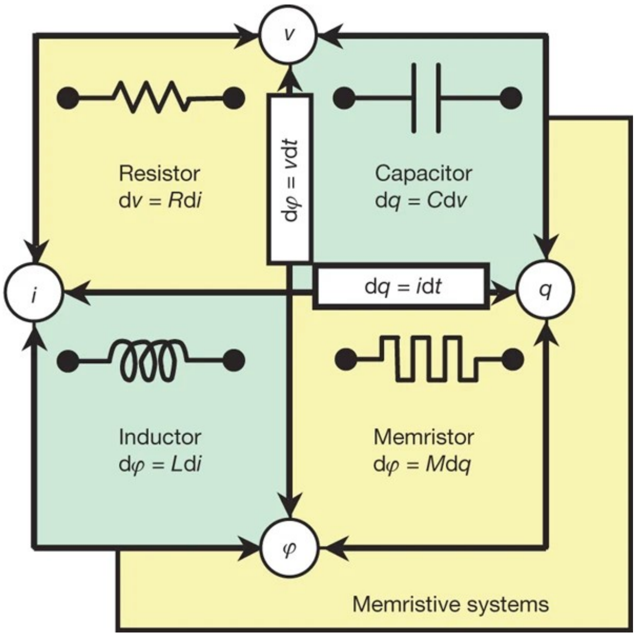

Fig. 1. Memristor in the resistor, capacitor and inductor assembly

2. On the other hand, it can be verified that memristors present applications of programming logic (Snider, GS 2007 | Mao, JY; Zhou, L.; Zhu, X.; Zhou, Y.; Han, ST 2019 | Xia, L. ; Li, B.; Tang, T.; Gu, P.; Chen, PY; Yu, S.; Yang, H. 2017), signal processing and electrical stimuli (Mouttet, BL 2007), even in neural networks such as This is demonstrated by the article by Stanley Williams himself (Pickett, MD; Medeiros-Ribeiro, G.; Stanley-Williams, R. 2013) where the term "neuristor" is coined. It is worth mentioning that in his work, the concept is tested with nanoscale metal oxide semiconductors. Graphene oxide had not yet been implemented as of the publication date of Williams' paper. Despite this, it shows that the neuristor "*it exhibits the important neural all-or-nothing functions with signal gain peaks and various periodic peaks, using materials and structures that are capable of extremely high-density integration with or without silicon transistors* . "

Facts

1. Knowing the concept of "memristor", we proceed to analyze the article proposed for this entry by (Yan, X.; Zhang, L.; Chen, H.; Li, X.; Wang, J.; Liu, Q.; Zhou, P. 2018). In the abstract of their article they clearly indicate the state of the art " *Memristors as artificial electronic synapses have attracted increasing attention in neuromorphic computing. The emulation of the processes of" learning "and" forgetting "requires progressive adjustment. Bidirectional of the conductance of the memristor, which is a challenge for state-of-the-art artificial intelligence* . "

2. The article performs conductance experiments to modulate the memristor signals with voltage pulses of 0.6 Volts, in order to interpret the binary logic patterns. As they point out, " *bidirectional progressive conduction modulation mimics various plastic synapses, such as peak timing-dependent plasticity and facilitation of paired pulses* ." The purpose of the work is "*to provide a method for the memristor to achieve attractive features such as bidirectional tuning, low power consumption and high speed switching which is in urgent demand for further evolution of neuromorphic chips*."This is the proof that memristors or neuristors are the basis for the development of neuromorphic chips, which is why it is circumscribed in the area of neuromorphic engineering, but on a nanometric scale and with graphene oxide superconductors.

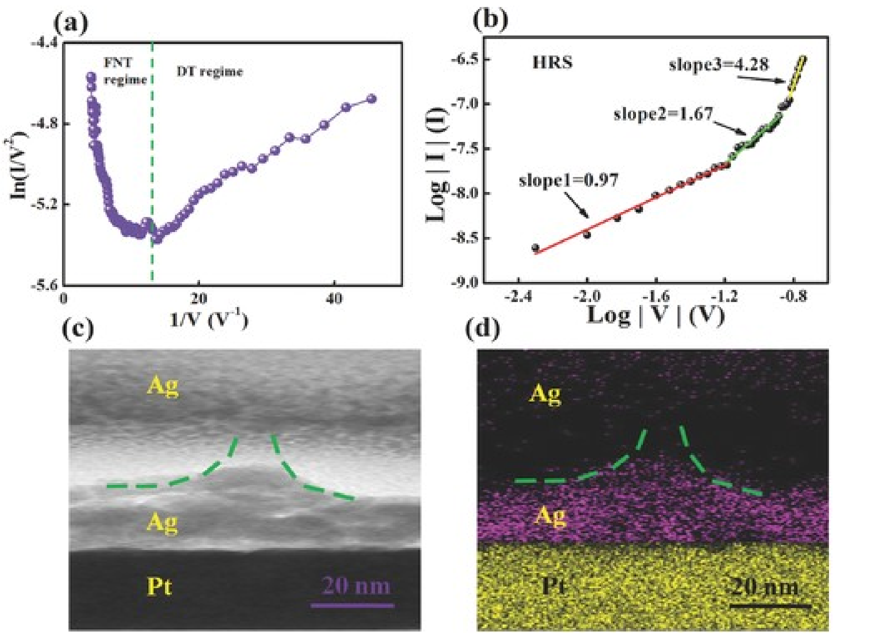

Fig. 2. Microscopic characterization of pulses in the graphene oxide memristor

3. The study concludes that the proposed model is feasible and " *resembles many functions of biological systems, including non-linear transmission and learning experience behavior* ." Finally it is stated " *the devices present a promising option for future applications in neural computing systems with low power consumption and ultrafast switching speed* ". In fact, some of the authors of the article also participated in the study of the self-assembled network of quantum dots with which it is expected to improve the qualities of memristors to store large amounts of information (Yan, X.; Pei, Y .; Chen, H.; Zhao, J.; Zhou, Z.; Wang, H.; Zhou, P. 2019).
4. Graphene oxide quantum dots have been studied from the point of view of toxicity in the human body (Wang, D., Zhu, L., Chen, JF and Dai, L. 2015 | Li, M .; Gu, MM; Tian, X .; Xiao, BB; Lu, S .; Zhu, W .; Shang, ZF 2018 | Xu, L .; Zhao, J .; Wang, Z. 2019), reaching the conclusion of that generate damage to the DNA of cells, causing genotoxic responses. These studies clearly demonstrate the orientation of implanting the memristors / neuristors in the human body. Otherwise there would be no point in performing toxicity tests.
5. It is essential to cite or mention other similar studies in line with memristors and graphene oxide, namely (Prasad-Sahu, D.; Jetty, P.; Narayana-Jammalamadaka, S. 2020 | Sahu, DP; Jetty, P.; Jammalamadaka , SN 2021) among others that can be found with the following queries a) intitle: "memristor" intitle: "graphene oxide" b) "graphene" "quantum dots" "memristor" and c) intitle: "graphene" intitle: " quantum dots "(" memristor "OR " transistor "OR" neuristor ") .

Reviews

1. The relationship between graphene oxide and memristors / neuristors is clear, since their production, programming and operation is perfectly possible, as demonstrated in the scientific literature reviewed in the form of graphene quantum dots.
2. The scientific intention of implanting neuristor chips in the human body is proven due to the multiple toxicity tests that have been carried out. This agrees with the idea of developing the human-machine interface sought from the transhumanist currents.
3. It has been shown that the logic of neuristors can be programmed, so this opens the way to an uncertain future, in which the control of the human being and its neural programming is perfectly possible. I consider this implementation very dangerous, since it would mean the end of freedom, as we know it.

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