A Review of CNTFET Technology over CMOS Technology for Low Power Applications

Prof. Yen

[1]Professor
[1]Department of Electronics, China
[1] yen89@gmail.com*
* corresponding author

ARTICLE INFO

Article History:
Received January 1, 2020
Revised January 31, 2020
Accepted March 12, 2020

Keywords:
CNTFET, CMOS, Biosensor, Low Power Applications, OTA etc.

Correspondence:
E-mail: yen89@gmail.com

ABSTRACT

In the recent year the scalability of silicon beyond nano regime is quite difficult so there must be an alternative to replace the silicon in the VLSI industries. CNT may be the most promising material to replace silicon technology. Many potential application of CNTFETs to realize digital logic gates. Many potential applications have been proposed for carbon nanotubes, including conductive and high strength composites, energy storage and energy conversion devices, sensor, field emission display, nanometer sized semiconductor devices, probes and interconnects. CNTFETs are sensitive to a wide range of alcoholic vapors so there is the possibility of chemical sensor based on carbon nanotube and exhibit excellent properties of transducer. CNTFETs conducting channels have been developed and can been used for biosensing and biodetection. CNTFET has been used in hybrid nanotechnology application where possibilities to integrate CNT fabrication with standard commercial CMOS very large scale integration on a single substrate suitable for emerging hybrid technology applications. CNT has been used to enhance the performance of Operational Transconductance Amplifier.

References

[1] User Guide on Stanford University Carbon Nanotube Field Effect Transistors (CNFET) HSPICE Model v. 2.2.1. To download model, please visit: https://nano.stanford.edu/stanford-cnfet-model.

[2] To download PTM MOSFET models, please visit: http://ptm.asu.edu/latest.html.

[3] A Zaidi, T.A.Khan, M.Nizamuddin and A.Zaidi, "Design & Simulation Of Carbon Nano Tube Based Logic Circuit (Inverter) For Advance Applications", VSRD International Journal of Electrical, Electronics & Communication Engineering, Vol.2 No.10 Oct.2012.

[4] S. Das, S. Bhattacharya, D.Das, "Design of Digital Logic Circuits using Carbon Nano tube Field Effect Transistors", International Journal of Soft Computing and Engineering (IJSCE), 2231-2307, Vol.1 No.6, Dec 2011.

[5] P.A.Gowri Sankar, Dr. K.U.Kumar, "Investigating The Effect Of Chirality On Coaxial Carbon Nano tube Field Effect Transistor", International Conference on Computing, Electronics and Electrical Technologies [ICCEET], IEEE 2012

[6] Ao Teng, Physical Properties of Carbon Nanotubes, Dept of Physics, Uni. of Tennessee, 2010.

[7] V. Sridevi, T. Jayanthy,"Hspice Implementation of CNTFET Half and Full subtractor", International Journal of Advanced Engineering Sciences & Technologies, Vol.11 No.1, 89 – 95, 2011

[8] "CMOS Digital Integrated Circuits Analysis and Design", by Sung-Mo Kang and Yusuf Leblebici, Third Edition.

[9] "CMOS Circuit Design, Layout and Simulation", by R. Jacob Baker, Harry W. Li, David E. Boyce, IEEE Press.

[10] 'HSPICE® User Guide: Simulation and Analysis Version B-2008.09,

September 2008, pdf by Synopsis.