Ayman Z. Rizk

Contact

☎ +971-55-5399908
@ Ayman@floppi.es
http://floppi.es
54224, Abu Dhabi, UAE

Semiconductor engineer with 10-year clean room experience, capable of manning various cleanroom equipment, managing data and inspecting the devices being fabricated.

I'm seeking challenging opportunities in Micro- & Nano-electronics fabrication and sharpening my skills by taking quality experience, possibly with extending Moore's law, TFDs, NVMs, FEOL and nano Technology-CAD.

Education

Jan 2014 – May 2018

Ph.D., Microsystems Engineering

Masdar Institute, UAE in collaboration with Massachusetts Institute of Technology, US

Dissertation: Optimization of Al doped ZnO thin films for flexible TFTs and Piezoelectric Sensors
Advisor: Irfan Saadat

Sep 2010 – May 2012

M.Sc., Microsystems Engineering

Masdar Institute, UAE in collaboration with Massachusetts Institute of Technology, US

Thesis: Low Power Memory Design
Advisor: Ammar Nayfeh

Sep 2005 – Jun 2009

B.Sc., Electronics and Communication

Tanta Faculty of Engineering, Egypt

Thesis: Open Source Radio Frequency Identification (RFID) Project
Advisor: Yaser Bagory

Experience

Oct 2018 – Present

Postdoctoral Fellowship, Khalifa University for Science & Technology, UAE

- Kelvin Probe Force Microscopy, Conductive-AFM and Electrostatic Force Microscopy
- High vacuum systems
- Metallic/Semiconductor nanoparticles
- 2D Materials
- Nano Non-volatile Memories

Sep 2010 – May 2018

Research Assistant, Masdar Institute for Science & Technology, UAE

- Deposition methods (ALD, PECVD, MOCVD, Sputtering, Thermal and E-Beam Evaporation)
- Lithography techniques (EBL, Wet and RIE Etch)
- Spectroscopy and Microscopy (SEM, AFM, TEM, XRD, W/EDS and Raman)
- Fabrication and TCAD Modeling of state of the art 1D and 2D structures using new materials for thin film nonvolatile memory structures with nanoparticles & ultrathin trapping layers in collaboration with UNAM, Ankara University, Turkey
- TCAD Modeling of fast switching/memory devices using Si nanowires and solar cell with embedded quantum dots
- Growing doped ZnO thin films using atomic layer deposition. Characterizing them using XRD, Raman, SEM, AFM, PFM, four-point probe resistivity and hall effect measurements.
- Demonstrating thin film transistors grown on flexible and transparent substrate using the doped ZnO films. Fabricating devices with various doping levels and growth conditions and optimizing their mobility, On-Off current ratio and threshold voltage
- Investigating the piezoresponse of doped ZnO thin films for strain sensing applications. Fabricating and characterizing a proof-of-concept strain sensor

Oct 2016 – May 2018

Lecturer, Masdar Institute for Science & Technology, UAE

Sep 2010 – May 2016

Teaching Assistant, Masdar Institute for Science & Technology, UAE

- Advanced Integrated Circuits Technology
- Microelectronics Devices and Circuits
- Integrated Microelectronics Devices
- Technology Computer-aided design (TCAD)

Sep 2005 – Jun 2009 **Teaching Assistant**, Tanta University, Faculty of Engineering, Egypt

- Complementary metal oxide semiconductor
- Electrical and Electronic Materials
- Very large-scale integration

Publications

Improved figures of merit of nano-Schottky diode by embedding and characterizing individual gold nanoparticles on n-Si substrates [Article]
Abbas, Y.; Rizk, A.; Anwer S.; Saadat, I; Nayfeh, A.; Rezeq, M.
Nanotechnology, vol. 31, no. 12, Jan 2020. DOI: 10.1088/1361-6528/ab5e3e

Effects of 2.85 nm Si Nanoparticles on AZO/n+/p-cSi Thin Film Solar Cell [Conference]
Abdul Hadi S.; Rizk A.; Nayfeh A.
47th IEEE Photovoltaic Specialists Conference (PVSC 47), Calgary, 14-19 June 2020

Effect of Si Nano-particle Multiple Coats on Reflectance Spectra for Ge and Ge/Si Substrates [Conference]
Abdul Hadi S.; Rizk A.; Nayfeh A.
2020 MRS Spring Meeting & Exhibit, Phoenix, 13-17 April 2020

Charge Effect of an Isolated Gold Nanoparticle Embedded in High-k Oxide [Conference]
Rizk, A.; Abbas, Y.; Saadat, I; Nayfeh, A.; Rezeq, M.
20th IEEE International Conference on Nanotechnology (IEEE-NANO), Montreal, 28-31 July 2020

Exploring the Electronic Properties of Individual Gold NPs on n- type Si surfaces [Conference]
Abbas, Y.; Rizk, A.; Saadat, I; Nayfeh, A.; Rezeq, M.
20th IEEE International Conference on Nanotechnology (IEEE-NANO), Montreal, 28-31 July 2020

Modulating Surface Roughness of Low Temperature PECVD Germanium using Multilayer Drop Casting of 2.85nm Silicon Nanoparticles [Conference]
Ashraf J.; Rizk A.; Alnaqbi W.; Alhammadi A.; Abdul Hadi S.; Nayfeh A.
20th IEEE International Conference on Nanotechnology (IEEE-NANO), Montreal, 28-31 July 2020

Photodetection Characteristics of Gold Coated AFM Tips and n-Silicon Substrate nano-Schottky Interfaces [Article]
Abbas, Y.; Rizk, A.; Saadat, I; Nayfeh, A.; Rezeq, M.
Nature Scientific Reports, vol. 9, no. 13586, Sep 2019. DOI: 10.1038/s41598-019-49908-1

Stability and Endurance of ALD Al-doped ZnO TFTs Grown on Flexible Substrates [Article]
Rizk, A.; Saadat, I.
IEEE Electron Device Letters, IN REVIEW

Effect of Silver Nanoparticles on the Electrical Characterization of Oxide/Semicon. Heterojunctions [Conference]
Rizk, A.; Abbas, Y.; Saadat, I; Nayfeh, A.; Rezeq, M.
ECS Transactions 2019 (ECST), Dallas, vol. 89, issue 3, pp. 133-136, 26-29 May 2019. DOI: 10.1149/08903.0133ecst

Impact of Silver Nano-particles on Metal- Si Schottky Contact [Conference]
Rizk, A.; Abbas, Y.; Saadat, I; Nayfeh, A.; Rezeq, M.
19th IEEE International Conference on Nanotechnology (IEEE-NANO), Macau, 22-26 Jul. 2019

The Electrical Transport Characteristics of Ag-NP/n-Si nano Schottky Diodes using Conducting Atomic Force Microscope [Conference]
Abbas, Y.; Rizk, A.; Saadat, I; Nayfeh, A.; Rezeq, M.
Nanotech France 2019, Paris, 26-28 Jun. 2019

High-Performance ALD Al-doped ZnO Thin Film Transistors Grown on Flexible Substrates [Article]
Rizk, A.; Saadat, I.
IEEE Electron Device Letters, vol. 99, no. 12, pp. 1-1, Jan 2019. DOI: 10.1109/LED.2019.2890831

ALD Al-doped ZnO Thin Film as Semiconductor and Piezoelectric Material: Process Synthesis [Chapter]
The IoT Physical Layer: Design and Implementation
Rizk, A.; Saadat, I.
Springer International Publishing, 2018, Ch. 3, pp. 23-46. ISBN: 3319930990, 9783319930992

ALD Al-doped ZnO Thin Film as Semiconductor and Piezoelectric Material: Characterization [Chapter]
The IoT Physical Layer: Design and Implementation
Rizk, A.; Saadat, I.
Springer International Publishing, 2018, Ch. 4, pp. 47-68. ISBN: 3319930990, 9783319930992

ALD Al-doped ZnO Thin Film as Semiconductor and Piezoelectric Material: Transistors and Sensors [Chapter]
The IoT Physical Layer: Design and Implementation
Rizk, A.; Saadat, I.
Springer International Publishing, 2018, Ch. 5, pp. 69-82. ISBN: 3319930990, 9783319930992

Optimization of Al-doped ZnO films for flexible TFTs and piezoelectric sensors [Conference]

Rizk, A.; Saadat, I.
2017FLEX Europe, Munich, 14-17 Nov. 2017

Optimization of Piezoresponse in ALD Al Doped ZnO Thin Films on Flexible Substrates for IoT Related Sensing Applications [Conference Paper]
Rizk, A.; Saadat, I.
12th IEEE Nanotechnology Materials and Devices Conference (NMDC), Singapore, Oct 2017, pp. 27-28. DOI: 10.1109/NMDC.2017.8350489

Memory effect by charging of ultra-small 2-nm laser-synthesized solution processable Si-nanoparticles embedded in Si/Al_2O_3/SiO_2 structure [Article]
Elatab, N., Rizk, A., Tekcan, B., Alkis, S., Okyay, A. K. and Nayfeh, A.
Physica Status Solidi (a), vol. 212, no. 8, pp. 1751-1755, Feb 2015. DOI: 10.1002/pssa.201431802

An Electro-Dip-Coating Technique for Deposition of Metallic Nanoparticles over Silicon [Conference Paper]
Rizk, A.; Alkhatib, A.; Nayfeh, A.
MRS 2013 Fall Meeting, Boston, MA, 1-6 Dec. 2013

Modeling of InAs/GaAs Quantum Dot Solar Cells [Conference Paper]
Rizk, A.; Islam, K.; Nayfeh, A.
European Modelling Symposium, Manchester, Nov 2013, pp. 677-680. DOI: 10.1109/EMS.2013.113

Zinc-oxide charge trapping memory cell with ultra-thin chromium-oxide trapping layer [Article]
Elatab, N.; Rizk, A.; Okyay, A.K.; Nayfeh, A.
AIP Advances, vol. 3, no. 11, pp. 112-116, Nov 2013. DOI: 10.1063/1.4832237

Thin-Film ZnO Charge-Trapping Memory Cell Grown in a Single ALD Step [Article]
Oruc, F.B.; Cimen, F.; Rizk; A., Ghaffari; M.; Nayfeh, A.; Okyay, A.K.
IEEE Electron Device Letters, vol. 33, no. 12, pp. 1714-1716, Dec 2012. DOI: 10.1109/LED.2012.2219493

ZnO based charge trapping memory with embedded nanoparticles [Conference Paper]
Rizk, A.; Oruc, F.B.; Okyay, A.K.; Nayfeh, A.
12th IEEE International Conference on Nanotechnology (IEEE-NANO), Birmingham, Aug 2012, pp. 1-4. DOI: 10.1109/NANO.2012.6322033

Si nanowire memory [Conference Paper]
Rizk, A.; Nayfeh, A.
12th IEEE International Conference on Nanotechnology (IEEE-NANO), Birmingham, Aug 2012, pp. 1-5. DOI: 10.1109/NANO.2012.6322066

Skills

Proficient **and** *experienced* **with a vast array of skills, concepts and technologies:**

CVD (PECVD, ALD, *MOCVD*)	FEOL & *BEOL*	0D-2D & Bulk Structures	Lithography (Wet, RIE, *EBL*)
PVD (Sputter, Evaporation, E-beam)	*Photonics*	Piezoelectric Sensors	Semiconductor Oxides (ZnO)
Microscopy (SEM, AFM, KPFM, *TEM, STM*)	*MEMS*	Flexible Electronics	Memories (NVMs, *ReRAM*)
Spectroscopy (XRD, EDS, Raman, *XPS*)	*COMSOL*	Technology-CAD	*VHDL & Embedded Systems*