

Curriculum Vitae

February 2021.

Joel Molina is currently a Researcher and Full Professor at the National Institute of Astrophysics, Optics and Electronics (INAOE). His research interests include physics and technology of nanoscaled CMOS logic devices, non-volatile memory devices, solid-state sensors, MEMS and the development of ultra-thin high dielectric constant materials for application in logic, memory, sensing, photoactive and photocatalytic technologies. In the development of all these electron materials and devices, the manipulation of advanced solid-state materials at the nanoscale is essential and are all within the field of advanced integrated circuit fabrication technology.

PERSONAL DATA

Full Name: **Joel Molina Reyes.**
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CURRENT ADSCRIPTION

Institution and Current Position: National Institute of Astrophysics, Optics and Electronics (INAOE). Professor, "C" level.
Department: Electronics Department (Microelectronics Group).
SNI Member: Level 1 of the National Researchers System (SNI is the highest and most prestigious ranking for scientists in Mexico).

EDUCATION

Ph.D. Tokyo Institute of Technology. Interdisciplinary Graduate School of Science and Engineering. Department of Electronics and Applied Physics. Tokyo, Japan (June, 2007).
M.Sc. National Institute of Astrophysics, Optics and Electronics (INAOE). Electronics Department, Tonantzintla, Puebla. México (July, 2002).
B.Sc. Universidad Veracruzana. Facultad de Ingeniería Electrónica. Poza Rica, Veracruz, México (August, 1999).

VISITING POSITIONS

20180901 – 20191231 Visiting Professor at Tokyo Institute of Technology
Electrical and Electronic Engineering, School of Engineering.
Center of Innovation Program (supported by Conacyt and by the Japan Science and Technology Agency). JAPAN

EMPLOYMENT RECORD

20071101 – up to now National Institute of Astrophysics, Optics and Electronics (INAOE). Working for the National Nanoelectronics Laboratory. Full-Time Professor, Level "C". Microelectronics Group. MEXICO.
20050401 – 20070331 Semiconductor Technology Academic Research Center (STARC). Young Graduate Student Researcher Program. STARC (Fujitsu and Toshiba). Research and Development facilities at Tokyo and Yokohama. JAPAN.
20020801 – 20021231 Universidad Popular Autónoma del Estado de Puebla (UPAEP). Working for the Undergraduate Program on Mechatronics. Adjunct Professor. Mechatronics Group. MEXICO.

GRANTED AWARDS, RESEARCH FUNDS AND HONORS

- **Best Poster Award in 2020 Workshop on Water Treatment using Sustainable Technologies.** 1st place award and kindle prize to one of my doctoral students for presenting the best poster with the work "Study of TiO₂ Nanostructures as Photoactive Elements for Water Decontamination". This work was presented at the Center for Research and Advanced Studies of the National Polytechnic Institute (CINVESTAV-IPN), in Mexico City, Mexico (February 2020).
- **Best Paper Award in IRPS2019.** Best paper award with the research work "Spatio-Temporal Defect Generation Process in Irradiated HfO₂ MOS Stacks: Correlated versus Uncorrelated Mechanisms". This work was presented at the IEEE International Reliability Physics Symposium IRPS2019 conference, held at Monterey, California, USA (April 2019).
- **Best Student Paper Award in ALD2018 (top 5/600).** Award and \$500 USD cash prize to one of my doctoral students as a finalist for outstanding research performed by a graduate student with the work "Room-Temperature Resonant Tunneling by Band-Offset Engineering of Nano-laminated High-k Oxides Deposited by Atomic-Layer Deposition". This work was presented at the ALD2018 conference, held at Incheon, South Korea (July 2018).
- **Best Presentation Award in 1st Mexican Workshop on ALD 2015.** 1st place award for the best presentation on this national workshop with the work "ALD in the Development of Advanced Logic Technology" at the "1st Workshop on Atomic-Layer Deposition 2015". Puebla, Mexico (September 2015).
- **Award for Encouragement of Research in IUMRS-ICA 2014 (top 20/2000).** Award for excellent presentation of the work "Electrical Characteristics of Al/Al₂O₃/Al Stacked Structures Fabricated at 300°C on Glass" at the symposium "Control of Interfaces and Materials Processing for Nanoelectronics" of the IUMRS-ICA 2014 Conference. Fukuoka, Japan (August 2014).
- **Best Presentation Award in SENSORDEVICES 2013 (top 3/60).** Award for excellent presentation with the work "Carrier Photogeneration during UV-Vis Irradiation on Horizontal and Vertical Metal-Semiconductor Structures Based on R-TiO₂ Nanoparticles" at the symposium "Sensor Device Technologies" of the "4th International Conference on Sensor Device Technologies and Applications, SENSORDEVICES 2013". Barcelona, Spain (August 2013).
- **Vice-Chair of the IEEE-EDS Subcommittee for Regions & Chapters (2021-2022).** IEEE Region 9, Latin America.
- **Chair of the IEEE-EDS Puebla Chapter (2018-2020).** IEEE-EDS is the premier global society devoted to advancing the field of electron device engineering.
- **IEEE Senior Member Grade.** Honor bestowed by the IEEE in recognition to those professionals who have made significant and excellent contributions in their research fields. New York, USA (June 2015).
- Private Research Fund. Grant awarded by IEEE – Electron Devices Society through the program 2020 IEEE HAC & SIGHT Projects - Response to COVID-19 funding the project "UV-A LED arrays and photocatalytic TiO₂ coatings on protective screens for SARS-Cov-2 inactivation" which aims the development of protective barriers for containment and inactivation of coronavirus in hospital rooms attending Covid-19 patients. USA (2020). Amount: \$5,000. USD

- Private Research Fund. Grant awarded by Nikkiso Inc. Ltd., for projects related to the use of UV-A/B/C LED light as illumination source for pathogen inactivation in surfaces: “Bacteria inactivation in water sources using UV-LED illumination and TiO₂ nanostructures” which aims the use of efficient LED arrays as a low power and highly uniform illumination source for pathogen inactivation on several surfaces. Japan (2020). Amount: \$5,000. USD
- Private Research Fund. Grant awarded by IEEE – Electron Devices Society for organizing the 2020 IEEE Electron Devices Society (EDS) Summer School on the topic “Development of a superconducting solid-state architecture based on Josephson junctions as a preliminary study for quantum science and technology” at INAOE. USA (2020). Amount: \$15,000. USD
- Private Research Fund. Grant awarded by Space Charge LLC, for research on the development of Ytria-Stabilized Zirconia (YSZ) thin films and their application as solid electrolyte with high ionic conductivity in solid-state batteries. USA (2016). Amount: \$3,200.USD
- Private Research Fund. Grant awarded by Universidad Autonoma Metropolitana, for research on ISFET and ISCAP sensor devices and their application in monitoring of pH for potable water. Mexico (2015). Amount: \$25,000.USD
- Private Research Fund. Grant awarded by Freescale Corp., for research on ISFET sensor devices for Bio-Medical applications using fully-CMOS based processing. Mexico-USA (2009-2011). Amount: \$50,000.USD
- Public Research Fund. Grant awarded by CONACyT for organizing the 1st Symposium on “Fundamentals, Characterization and Application of Atomic-Layer Deposited Materials”, held within the international congress IMRC2017 (August 2017). Amount: \$5,000.USD
- Public Research Fund. Grant awarded by CONACyT for research on nano-CMOS processing using Atomic-Layer-Deposition (ALD) of ultra-thin high-k dielectrics on silicon. Mexico (2009-2012). Amount: \$130,000.USD
- SNI Member, Level I. Fellowship awarded by CONACyT for joining the National Researchers’ System. Mexico (January 2012 – up to now).
- SNI Member, Candidate Level. Fellowship awarded by CONACyT for joining the National Researchers’ System. Mexico (January 2009 – December 2011).
- Scientist Repatriation. Fellowship/grant awarded by CONACyT for semiconductor devices’ research within a Mexican research institution. Mexico (2008-2009).
- Young Graduate Student Researcher. Scholarship granted by the Semiconductor Technology Academic Research Center (STARC, Japan) for doctoral related work on advanced metal gate/high-k stacked MOSFET structures. Japan (2004–2006).
- Doctoral Course Studies. Scholarship Granted by the Ministry of Education, Culture, Sports, Science and Technology (Monbukagakusho) for Doctoral Course Studies. Japan (2003–2007).
- Master Course Studies. Scholarship Granted by the Mexican Council for Science and Technology (CONACyT) for Master Course Studies. Mexico (1999–2001).
- *Magna Cum Laude*. 3rd Best Academic Record of the 1994–1999 Generation at the Electronics and Communications Engineering Faculty of the University of Veracruz. Mexico (1999).
- Undergraduate Course Studies. Scholarship Granted by the University of Veracruz for Undergraduate Course Studies. Mexico, (1995–1999).

PUBLICATIONS IN PEER-REVIEWED JCR INDEXED JOURNALS (INCLUDING DOI, ISSN)

1. A. Romero, J.L. Sanchez and **J. Molina**, “Influence of selected reactive oxygen species on photocatalytic activity of TiO₂/SiO₂ composite coatings processed at low temperature”, *accepted for publication in Applied Catalysis B: Environmental* (2021). DOI: 10.1016/j.apcatb.2020.119685.
2. H. E. Martínez, F. J. De La Hidalga, C. Zúñiga, M. Moreno, **J. Molina**, N. Ramirez and W. Calleja, “On the Roughness Analysis of High-Index Silicon Wafers Using KOH-IPA Solutions”, *ECS Journal of Solid State Science and Technology*, 10, pp. 014002 (2021). DOI: 10.1149/2162-8777/abd882.
3. V. Rajaa, K. Hadiyala, A.K. Natha, L.R. Viannia, P. Sonar, **J. Molina** and R. Thamankar, “Effect of Controlled Humidity on Resistive Switching of Multilayer VO₂ devices”, *Materials Science & Engineering B*, 264, 114968 (2021). DOI: j.mseb.2020.114968.
4. **J. Molina**, A. Romero and J.L. Sanchez, “Enhanced photocatalytic bacterial inactivation of atomic-layer deposited anatase-TiO₂ thin films on rutile-TiO₂ nanotubes”, *Photochemical and Photobiological Sciences*, Vol. 19, pp. 399-405 (2020). DOI: 10.1039/C9PP00348G.
5. **J. Molina**, A. Romero, H. Uribe, B. Lopez, J.L. Sanchez, E. Ortega, A. Ponce, A. Morales, F. Lopez, et al., “Study on the photocatalytic activity of titanium dioxide nanostructures: nanoparticles, nanotubes and ultra-thin films”, *Catalysis Today*, vol. 341, pp. 2-12 (2020). DOI: 10.1016/j.cattod.2018.05.033.
6. S.S. Rodriguez, F.L. Huerta, A.L.H. May, **J. Molina** and J.M. Castillo, “Analytical drain current model for a-SiGe:H thin film transistors considering density of states”, *Electronics*, vol. 9 (6), pp. 1016 (2020). DOI: 10.3390/electronics9061016.
7. **J. Molina**, T. Hoshii, S. Ohmi, H. Funakubo, A. Hori, I. Fujiwara, H. Wakabayashi, K. Tsutsui et al., “NiSi₂ as a bottom electrode for enhanced endurance of ferroelectric Y-doped HfO₂ thin films”, *Japanese Journal of Applied Physics*, Vol. 59, SGGB06 (2020). DOI: 10.35848/1347-4065/ab6b7c.
8. E.M. Pascual, G. Mendez, H. Uribe, R. Torres and **J. Molina**, “MIM capacitors as simple test vehicles for the DC/AC characterization of ALD-Al₂O₃ with auto-correction of parasitic inductance”, *Microelectronics Reliability*, vol. 104, pp. 113516 (2020). DOI: 10.1016/j.microrel.2019.113516.
9. H. Uribe, **J. Molina**, E. Ortega and A. Ponce, “Rectifying Characteristics of Resonant Tunneling MIS Devices Using Ultra-Thin High-k Oxides Deposited by ALD”, *IEEE Electron Device Letters*, Vol. 39, No. 9, pp. 1461-1464 (2018). DOI: 10.1109/LED.2018.2859183.
10. **J. Molina**, H. Uribe, E. Ortega and A. Ponce, *Applied Surface Science*, “Resonant tunneling MIM diode based on intrinsic quantum-well formation of ultra-thin atomic layered films after band-offset engineering”, vol. 458, pp. 166-171 (2018). DOI: 10.1016/j.apsusc.2018.06.198
11. H. Uribe, **J. Molina**, A. Romero, E. Ortega and A. Ponce, “Gate modeling of metal-insulator-semiconductor devices based on ultra-thin atomic-layer deposited TiO₂”, *Journal of Materials Science: Materials in Electronics*, vol. 29, pp. 15761–15769 (2018). DOI: 10.1007/s10854-018-9240-8.
12. H. Uribe and **J. Molina**, “Parameter extraction of gate tunneling current in metal–insulator–semiconductor capacitors based on ultra-thin atomic-layer deposited Al₂O₃”, *Journal of Materials Science: Materials in Electronics*, vol. 29, pp. 15496-15501 (2018). DOI: 10.1007/s10854-018-9104-2.
13. **J. Molina**, H. Tiznado, G. Soto, M. Vargas, et al., “Physical and electrical characterization of yttrium-stabilized zirconia (YSZ) thin films deposited by sputtering and atomic-layer deposition”, *Journal of Materials Science: Materials in Electronics*, vol. 29, pp. 15349-15357 (2018). DOI: 10.1007/s10854-018-8909-3.
14. **J. Molina**, “Design and Electrochemical Characterization of Ion-Sensitive Capacitors with ALD Al₂O₃ as the Sensitive Dielectric”, *IEEE Sensors Journal*, Vol 18, pp. 231-236 (2018). DOI: 10.1109/JSEN.2017.2754958.
15. **J. Molina** and L. Hernandez-Martinez, “Understanding the Resistive Switching Phenomena of Stacked Al/Al₂O₃/Al Thin Films from the Dynamics of Conductive Filaments”, *Complexity*, Vol. 2017, Article ID 8263904, (2017). DOI: 10.1155/2017/8263904.
16. **J. Molina**, H. Uribe-Vargas, R. Torres, P.G. Mani-Gonzalez and A. Herrera-Gomez, “Accurate modeling of gate tunneling currents in Metal-Insulator-Semiconductor capacitors based on ultra-thin atomic-layer deposited Al₂O₃ and post-metallization annealing”, *Thin Solid Films*, Vol. 638 pp. 48-56 (2017). DOI: 10.1016/j.tsf.2017.07.031.
17. R. Thamankar, F.M. Puglisi, A. Ranjan, N. Raghavan, K. Shubhakar, **J. Molina**, L. Larcher, A. Padovani, P. Pavan, S.J. O’Shea and K.L. Pey, “Localized characterization of charge transport and random telegraph noise at the nanoscale in HfO₂ films combining scanning tunneling microscopy and multi-scale simulations”, *Journal of Applied Physics*, Vol. 122, 024301 (2017). DOI: 10.1063/1.4991002.
18. **J. Molina**, R. Torres, A. Ranjan and K.L. Pey, “Resistive switching characteristics of MIM structures based on oxygen-variable ultra-thin HfO₂ and fabricated at low temperature”, *Materials Science in Semiconductor Processing*, Vol. 66, pp. 191-199 (2017). DOI: 10.1016/j.mssp.2017.05.001.

19. W.H. Montero, C. Zuñiga, A. Itzmoyotl, **J. Molina**, and L.E. Serrano, "Influence of SiH₄ and pressure on PECVD preparation of silicon films with subwavelength structures", **Journal of Vacuum Science and Technology B**, Vol. 35, 011204 (2017). DOI: <http://dx.doi.org/10.1116/1.4973303>.
20. A. Ranjan, N. Raghavan, **J. Molina**, S. J. O'Shea, K. Shubhakar, and K. L. Pey, "Analysis of quantum conductance, read disturb and switching statistics in HfO₂ RRAM using conductive AFM", **Microelectronics Reliability**, Vol. 64, pp. 172-178 (2016). ISSN: 0026-2714. DOI: 10.1016/j.microrel.2016.07.112.
21. A.O. Conde, A.S. Gonzalez, R.T. Torres, **J. Molina**, R.S. Murphy and F.J.G. Sanchez, "Conductance-to-Current-Ratio-Based Parameter Extraction in MOS Leakage Current Models", **IEEE Transactions on Electron Devices**, Vol. 63, No. 10, pp. 3844-3850 (2016). DOI: 10.1109/TED.2016.2597964.
22. D.M. Cortes, R. Valderrama, R. Torres and **J. Molina**, "Modeling a MIM capacitor including series resistance and inductance for characterizing nanometer high-K dielectric films", **Microwave and Optical Technology Letters**, Vol. 58, Iss. 11, pp. 2599-2602 (2016). ISSN: 1098-2760. DOI: 10.1002/mop.30103.
23. **J. Molina**, R. Thamankar and K.L. Pey, "Performance of ultra-thin HfO₂-based MIM devices after oxygen modulation and post-metallization annealing in N₂", **Physica Status Solidi A**, Vol. 213, Iss. 7, pp 1807-1813 (2016). DOI: 10.1002/pssa.201532993.
24. C.R.B. Alvarez, M.L. Aranda, A.T. Jacome, M.M. Moreno, **J. Molina**, C. Zuniga and W. Calleja, "A Generic MEMS Fabrication Process Based on a Thermal Budget Approach", **Journal of Electronics Cooling and Thermal Control**, Vol. 6, No. 2, pp. 97-107 (2016). ISSN: 2162-6162. DOI: 10.4236/jectc.2016.62009.
25. D.D. Alonso, M. Moreno, **J. Molina**, C. Zuniga, W. Calleja, J.C. Cisneros, L.N. De Rivera, V. Ponomaryov, F. Gil, A. Guillen and E. Flores, "Hermetic Capacitive Pressure Sensors for Biomedical Applications", **Microelectronics International**, Vol. 33 Iss 2, pp. 79 - 86 (2016). DOI: 10.1108/MI-05-2015-0046.
26. R. Thamankar, N. Raghavan, **J. Molina**, F.M. Puglisi, S.J. O'Shea, K. Shubhakar, L. Larcher, P. Pavan, A. Padovani and K.L. Pey, "Single vacancy defect spectroscopy on HfO₂ using Random Telegraph Noise signals from Scanning Tunneling Microscopy", **Journal of Applied Physics**, Vol. 119, No. 8, 084304 (2016). ISSN: 0021-8979. DOI: 10.1063/1.4941697.
27. L.A. Carrillo, G. Espinosa, B.M. Perez and **J. Molina**, "pH ISFET sensor with PVTa compensation", **Electronics Letters**, Vol. 52, No.1, pp. 15-17 (2016). ISSN: 0013-5194. DOI: 10.1049/el.2015.2573.
28. **J. Molina**, R. Valderrama, C. Zuniga, P. Rosales, W. Calleja, A. Torres, J. Hidalgo and E. Gutierrez, "Influence of the Surface Roughness of the Bottom Electrode on the Resistive-Switching Characteristics of Al/Al₂O₃/Al and Al/Al₂O₃/W Structures Fabricated on Glass at 300°C", **Microelectronics Reliability**, Vol. 54, no. 12, pp. 2747-2753 (2014). ISSN: 0026-2714. DOI: 10.1016/j.microrel.2014.07.006.
29. S.C. Cejas, R. Torres, R. Valderrama and **J. Molina**, "Complex Permittivity Determination of Thin-Films Through RF-Measurements of a MIM Capacitor", **IEEE Microwave and Wireless Components Letters**, Vol. 24, no. 11, pp. 805-807 (2014). ISSN: 1531-1309. DOI: 10.1109/LMWC.2014.2348179.
30. **J. Molina** and B.M. Perez, "Study of the Chemical and Morphological Characteristics of Al₂O₃ and HfO₂ Surfaces after Immersion in Time-Dependent pH Solutions", **ECS Transactions**, Vol. 64, no. 1, pp. 3-9 (2014). DOI: 10.1149/06401.0003ecst.
31. B.M. Perez and **J. Molina**, "Electrochemical Characterization of Ion-Sensitive Capacitors with ALD Al₂O₃ as the Sensitive Dielectric", **ECS Transactions**, Vol. 64, no. 1, pp. 239-243 (2014). DOI: 10.1149/06401.0239ecst.
32. **J. Molina**, J. Hidalgo and E. Gutierrez, "Reduction in the Interface-States Density of Metal-Oxide-Semiconductor Field-Effect Transistors Fabricated on High-Index Si (111) Surfaces by using an External Magnetic Field", **Journal of Applied Physics**, Vol. 116, No. 6, 064510 (2014). ISSN: 0021-8979. DOI: 10.1063/1.4892891.
33. F. Quinones, J. Hidalgo, M. Moreno, **J. Molina**, C. Zuniga and W. Calleja "Mechanical characterization of polysilicon cantilevers using a thermo-mechanical test chip fabricated with a combined bulk/surface micromachining technique", **Results in Physics**, Vol. 4, pp. 119-120 (2014). ISSN: 2211-3797. DOI: 10.1016/j.rinp.2014.07.007.
34. **J. Molina**, C. Zuniga, E. Gutierrez, E. Mendoza, J.L. Sanchez and E.R. Bandala, "Carrier Photogeneration in Metal-Semiconductor Structures Using Thin Films of Rutile-Phase TiO₂ Nanoparticles", **International Journal On Advances in Systems and Measurements**, Vol. 7, No. 1-2, pp. 34-43 (2014). ISSN: 1942-261x.
35. **J. Molina**, C. Zuniga, M. Moreno, W. Calleja, P. Rosales, R. Ambrosio, F.J. De La Hidalgo, E. Gutierrez, A. Heredia, E.R. Bandala and J.L. Sanchez, "Physical and electrical characterization of TiO₂ particles after high temperature processing and before/after UV irradiation", **Canadian Journal of Physics**, Vol. 92, No. 7-8, pp. 832-837 (2014). ISSN: 1208-6045. DOI: 10.1139/cjp-2013-0603.
36. M. Dominguez, P. Rosales, A. Torres, F. Flores, **J. Molina**, M. Moreno, J. Luna and A. Orduña, "Planarized Ambipolar a-SiGe:H Thin-Film Transistors: Influence of the sequence of fabrication process", **Solid State Electronics**, Vol. 99, pp. 45-50 (2014). ISSN: 0038-1101. DOI: 10.1016/j.sse.2014.06.024.
37. M. Dominguez, P. Rosales, A. Torres, F. Flores, **J. Molina**, M. Moreno, J. Luna and A. Orduña, "Effects of germane flow rate in electrical properties of a-SiGe:H films for ambipolar thin-film transistors", **Thin Solid Films**, Vol. 562, pp. 260-263 (2014). ISSN: 0040-6090. DOI: 10.1016/j.tsf.2014.04.075.
38. **J. Molina**, R. Valderrama, W. Calleja, P. Rosales, C. Zuniga, E. Gutierrez, J. Hidalgo and A. Torres, "Memristance Effect of Metal-Insulator-Metal Structures using Al₂O₃ Film as Active Layer for Emergent Memory Devices", **Surfaces and Vacuum**, Vol. 27, No. 1, pp. 1-6 (2014). ISSN: 1665-3521.
39. **J. Molina**, J.L. Sanchez, C. Zuniga, E. Mendoza, R. Cuahtecotzi, G. Garcia, E. Gutierrez and E.R. Bandala, "Low-temperature processing of thin films based on rutile TiO₂ nanoparticles for UV photocatalysis and bacteria inactivation", **Journal of Materials Science**, Vol. 49, no. 2, pp. 786-793 (2014). ISSN: 0022-2461. DOI: 10.1007/s10853-013-7761-3.
40. **J. Molina**, C. Zuniga, E. Mendoza, J.L. Sanchez, E. Gutierrez and E.R. Bandala, "Using Thin Films of Rutile-Phase TiO₂ Nanoparticles as Photoactive Material in Metal-Semiconductor Structures with Low Thermal Processing", **Energy and Environment Focus**, Vol. 2, no. 4, pp. 299-306 (2013). ISSN: 2326-3059. DOI: 10.1166/eeef.2013.1068.
41. **J. Molina**, W. Calleja, P. Rosales, C. Zuniga, F.J. Hidalgo and A. Torres, "Performance of a MOHOS-type Memory using HfO₂ Nanoparticles as Charge Trapping Layer and Different Tunneling Oxide Thickness", **Transactions of the Materials Research Society of Japan**, Vol. 38, no. 4, pp. 569-572 (2013). ISSN: 1382-3469.
42. E. Guerrero, L.A. Carrillo, M.T. Sanz, **J. Molina**, N. Medrano and B. Calvo, "Offset and Gain Calibration Circuit for MIM-ISFET Devices", **Analog Integrated Circuits and Signal Processing International Journal**, 76:321-333 (2013). ISSN: 0925-1030. DOI: 10.1007/s10470-013-0077-z.
43. **J. Molina**, B.M. Perez, C. Zuniga, W. Calleja, P. Rosales and A. Torres, "Chemical and Morphological Characteristics of ALD Al₂O₃ Thin Film Surfaces After Immersion in pH Buffer Solutions", **Journal of the Electrochemical Society**, 160 (10) B201-B206 (2013). ISSN: 1945-7111. DOI: 10.1149/2.060310jes.
44. **J. Molina**, C. Zuniga, W. Calleja, P. Rosales, A. Torres and A.H. Gomez, "Physical and electrical characteristics of atomic-layer deposition-HfO₂ films deposited on Si substrates having different silanol Si-OH densities", **Journal of Vacuum Science and Technology A**, Vol. 31, 01A132 (2013). ISSN: 0734-2101. DOI: 10.1116/1.4769206.
45. **J. Molina**, A. Torres, G. Espinosa, M.T. Sanz, E. Guerrero, B. Perez, J. Fernandez, M. Hoque and P. Parris, "Integration of MOSFET/MIM structures using a CMOS-based technology for pH detection applications with high-sensitivity", **Procedia Chemistry**, Vol. 6, pp. 110-116 (2012). ISSN: 1876-6196. DOI: 10.1016/j.proche.2012.10.136.
46. **J. Molina**, R. Ortega, W. Calleja, P. Rosales, C. Zuniga and A. Torres, "MOHOS-Type Memory Performance using HfO₂ Nanoparticles as Charge Trapping Layer and Low Temperature Annealing", **Materials Science and Engineering B**, Vol. 177, no. 16, pp. 1501-1508. (2012). ISSN: 0921-5107. DOI: 10.1016/j.mseb.2012.02.029.
47. **J. Molina**, R. Ortega, W. Calleja, P. Rosales, C. Zuniga and A. Torres, "HfO₂ Nanoparticles Embedded within a SOG-Based Oxide Matrix as Charge Trapping Layer for SOHOS-Type Memory Applications", **Journal of Non-Crystalline Solids**, Vol. 358, no. 17, pp. 2482-2488. (2012). ISSN: 0022-3093. DOI: 10.1016/j.jnoncrysol.2011.12.050.

48. M. Dominguez, P. Rosales, A. Torres, M. Moreno, **J. Molina**, F. DeLa Hidalga, C. Zuniga and W. Calleja, "Ambipolar a-SiGe:H Thin-Film Transistors Fabricated at 200°C", **Journal of Non-Crystalline Solids**, Vol. 358, no. 17, pp. 2340-2343. (2012). ISSN: 0022-3093. DOI: 10.1016/j.jnoncrysol.2011.12.051.
49. **J. Molina**, A. Muñoz, W. Calleja, P. Rosales and A. Torres, "High-Quality Spin-On Glass-Based Oxide as a Matrix for Embedding HfO₂ Nanoparticles for Metal-Oxide-Semiconductor Capacitors", **Journal of Materials Science**, Vol. 47, no. 5, pp. 2248-2255 (2012). ISSN: 0022-2461. DOI: 10.1007/s10853-011-6036-0.
50. **J. Molina**, A. Muñoz, A. Torres, M. Landa, P. Alarcón, and M. Escobar, "Enhancement on the Electrical Characteristics of MOS Devices by Reducing the Organic Content of H₂O-Diluted Spin-On-Glass Based Oxides", **Materials Science and Engineering B**, Vol. 176, no. 17, pp. 1353-1358. (2011). ISSN: 0921-5107. DOI: 10.1016/j.mseb.2011.03.005.
51. P. Rosales, A. Torres, F. J. de la Hidalga, C. Zuñiga, **J. Molina**, M. Moreno, W. Calleja, "Impact of the Base Doping Concentration on the Transport Mechanisms in n-type a-SiGe:H/p-type c-Silicon Heterojunction", **Mexican Journal of Physics**, Vol. 57, no. 2, pp. 133-139 (2011). ISSN: 0035-001X.
52. M. Dominguez, P. Rosales, A. Torres, F. Coyotl, **J. Molina**, M. Moreno, C. Zuñiga, and W. Calleja, "Oxido de Silicio Spin-on-Glas como Dieléctrico de Compuerta Recocido a 200°C", **Surfaces and Vacuum**, Vol. 24, no. 1, pp. 1-4, *In Spanish*, (2011). ISSN: 1665-3521.
53. E. Gutierrez, **J. Molina**, P. Garcia, J. Martinez and F. Guarín, "Magneto-modulation of gate leakage current in 65nm nMOS transistors: Experimental, Modeling, and Simulation Results", **Solid-State Electronics**, Vol. 54, no. 9, pp. 1022-1026. (2010). DOI: 10.1016/j.sse.2010.04.017.
54. **J. Molina**, A. Torres, W. Calleja, K. Kakushima, P. Ahmet, K. Tsutsui, N. Sugii, T. Hattori, and H. Iwai, "Degradation and Breakdown of W-La₂O₃ Stack after Annealing in N₂", **Japanese Journal of Applied Physics**, Vol. 47, no. 9, 2008, pp. 7076-7080. (2008). DOI: 10.1143/JJAP.47.7076.
55. **J. Molina**, K. Tachi, K. Kakushima, P. Ahmet, K. Tsutsui, N. Sugii, T. Hattori, and H. Iwai, "Effects of N₂-Based Annealing on the Reliability Characteristics of Tungsten/La₂O₃/Silicon Capacitors", **Journal of the Electrochemical Society**, Vol. 154, no. 5, pp. G110-G116 (2007). DOI: 10.1149/1.2712823.
56. **J. Molina**, K. Kakushima, P. Ahmet, N. Sugii, K. Tsutsui, Takeo Hattori and H. Iwai, "Carrier Separation and Vth Measurements of W-La₂O₃ Gated MOSFET Structures After Electrical Stress", **IEICE Electronics Express**, Vol. 4, no. 6, pp. 185-191 (2007). DOI: 10.1587/lelex.4.185.
57. B. Sen, H. Wong, **J. Molina**, H. Iwai, J.A. Ng, K. Kakushima and C.K. Sarkar, "Trapping characteristics of lanthanum oxide gate dielectric film explored from temperature dependent current-voltage and capacitance-voltage measurements", **Solid-State Electronics**, Vol. 51, no. 3, pp. 475-480 (2007). DOI: 10.1016/j.sse.2007.01.032.
58. **J. Molina**, K. Tachi, K. Kakushima, P. Ahmet, K. Tsutsui, N. Sugii, T. Hattori, and H. Iwai, "Charge Trapping Characteristics of W-La₂O₃-nSi MIS Capacitors After Post-Metallization Annealing PMA in N₂", **ECS Transactions**, Vol. 3, no. 3, pp. 233-244 (2006). DOI: 10.1149/1.2355715.
59. E. Miranda, **J. Molina**, Y. Kim and H. Iwai, "Tunneling in sub-5nm La₂O₃ Deposited by E-beam Evaporation", **Journal of Non-Crystalline Solids**, Vol. 352, no. 1, pp. 92-97 (2006). DOI: 10.1016/j.jnoncrysol.2005.11.001.
60. **J. Molina**, K. Kakushima, P. Ahmet, N. Sugii, K. Tsutsui, and H. Iwai, "Electrical Breakdown and Reliability of Metal Gate-La₂O₃ Thin Films After Post-Deposition Annealing in N₂", **ECS Transactions**, Vol. 1, no. 5, pp. 757-765 (2006). DOI: 10.1149/1.2209321.
61. E. Miranda, **J. Molina**, Y. Kim and H. Iwai, "Degradation of High-k La₂O₃ Gate Dielectrics Using Progressive Electrical Stress", **Microelectronics Reliability**, 45, pp. 1365-1369 (2005). DOI: 10.1016/j.microrel.2005.07.022.
62. E. Miranda, **J. Molina**, Y. Kim, and H. Iwai, "Effects of high-field electrical stress on the conduction properties of ultrathin La₂O₃ films", **Applied Physics Letters** 86, no. 23, 232104 (2005). DOI: 10.1063/1.1944890.

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INTERNATIONAL CONFERENCES BY INVITATION

1. "Inactivación de patógenos presentes en fuentes de agua contaminada utilizando materiales nanoestructurados", March 22nd, 2021. Loja, Ecuador (2021).
2. "Pathogen inactivation using nanostructured TiO₂ surfaces with enhanced photocatalytic activity", *STEM-Covid19*. November 19th, 2020. New Mexico, USA (2020).
3. "Pathogen inactivation using nanostructured TiO₂ surfaces with enhanced photocatalytic activity", *IEEE-ICEV*. October 26th, 2020. Veracruz, Mexico (2020).
4. "Inactivation of bacteria in water sources using nanostructured TiO₂ with enhanced photocatalytic activity", Universidad Santo Tomas. June 11th, Colombia (2020).
5. "Processing of Electr. Mat. & Dev. for Advanced Logic, Memory, Sensing and Photoactive Techn.", Vellore Institute of Technology. February 2020, India (2020).
6. "Growth of Ferroelectric Phase in HfO₂", Tokyo Institute of Technology. December 2018, Tokyo, Japan (2018).
7. "Engineering of Solid-State Materials and Devices by ALD", University of Texas at Dallas. June, 2018. Dallas, Texas, USA (2018).
8. "ALD for Advanced Logic, Memory and Sensing Technologies", *IEEE-EDSSC*. October 20th, 2017. Hsinchu, Taiwan (2017).
9. "Development of Integrated Logic, Memory and Sensing Technologies using ALD", *X ICSMV*, September 26th, 2017. Chihuahua, Mexico (2017).
10. "Oportunidades de Colaboración para el Desarrollo de Micro y Nanotecnología Integrada en Mexico", *Webinar at the RGMX-UTD*. May 18th, (2017, online).
11. "CMOS Processing for the R&D of Advanced Logic, Memory and Sensing Technologies", *TUBF-IAP*. September 22nd, 2015. Freiberg, Germany (2015).
12. "NVM Devices Based on the Resistive Switching of Ultra-Thin HfO₂", Singapore University of Technology and Design, June 4th, 2015. Singapore (2015).