

Photonics West

2019

TECHNICAL PROGRAM

Conferences and Courses

2-7 February 2019

BIOS Expo

2-3 January 2019

Photonics West Exhibition

5-7 February 2019

The Moscone Center
San Francisco, USA

spie.org/pw

CONFERENCE 10919

10:25 am: **Atomic structure and electronic properties of the β -Ga₂O₃(100) and In₂O₃(111) cleavage surface investigated by STM/STS**, Cellina Seraphin Schulze, Jonathan Hofmann, Robert Ziellinski, Wjatscheslav Martyanov, Hendrik Janssen, Andrea Lenz, Martin Franz, Technische Univ. Berlin (Germany); Zbigniew Galazka, Leibniz-Institut für Kristallzüchtung (Germany); Holger Eisele, Technische Univ. Berlin (Germany) [10919-30]

10:45 am: **Hydrogen passivation of magnesium doped β -Ga₂O₃**, Jacob Ritter, Jesse Huso, Peter T. Dickens, Washington State Univ. (USA); Joel B. Varley, Lawrence Livermore National Lab. (USA); Kelvin G. Lynn, Matthew D. McCluskey, Washington State Univ. (USA) [10919-31]

11:00 am: **Anisotropy-induced issues in characterization of vacancy defects and compensation in Ga₂O₃ (Invited Paper)**, Filip Tuomisto, Iija Makkonen, Antti Karjalainen, Aalto Univ. (Finland) [10919-4]

SESSION 9

LOCATION: ROOM 302 (SOUTH LEVEL THREE) TUE 11:25 AM TO 2:55 PM

Ultra Wide Bandgap Oxide Semiconductors: Applications

Session Chairs: **Vinod Eric Sandana**, Nanovation (France); **Markus R. Wagner**, Technische Univ. Berlin (Germany)

11:25 am: **Progress on beta gallium oxide materials and transistor device scaling (Invited Paper)**, Kelson Chabak, Andrew Green, Kevin Leedy, Antonio Crespo, Dennis Walker Jr., Nolan Hendricks, Miles Lindquist, Neil Moser, Nicholas Miller, Adam Neal, Shin Mou, Gregg Jessen, Air Force Research Lab. (USA) [10919-16]

11:50 am: **Recent progress in vertical Ga₂O₃ transistors (Invited Paper)**, Masataka Higashiwaki, Man Hoi Wong, Takafumi Kamimura, Yoshiaki Nakata, Chia-Hung Lin, National Institute of Information and Communications Technology (Japan); Ken Goto, Tokyo Univ. of Agriculture and Technology (Japan) and Tamura Corp. (Japan); Akito Kuramata, Tamura Thermal Device Corp. (Japan); Shigenobu Yamakoshi, Tamura Corp. (Japan); Hisashi Murakami, Yoshinao Kumagal, Tokyo Univ. of Agriculture and Technology (Japan) [10919-22]

Lunch/Exhibition Break Tue 12:15 pm to 1:15 pm

1:15 pm: **Gallium-oxide trench-type devices (Invited Paper)**, Kohei Sasaki, Novel Crystal Technology, Inc. (Japan); Shigenobu Yamakoshi, Novel Crystal Technology, Inc. (Japan) and Tamura Corp. (Japan); Akito Kuramata, Novel Crystal Technology, Inc. (Japan) [10919-33]

1:40 pm: **Defects analysis of ZnGa₂O₄ thin-film transistors and related properties study (Invited Paper)**, Ray-Hua Horng, National Chiao Tung Univ (Taiwan) [10919-32]

2:05 pm: **Cubic ZnMgO alloys for deep ultraviolet applications (Invited Paper)**, Henryk Teisseyre, Institute of Physics, PAS (Poland); Izabella Gorczyca, Institute of High Pressure Physics (Poland); Dawid Jarosz, Institute of Physics, PAS (Poland); Małgorzata Wierzbowska, Institute of High Pressure Physics (Poland); Sławomir Kręt, Institute of Physics, PAS (Poland); Fabrice Donatini, Daniel Le Si Dang, Institut NÉEL (France) [10919-34]

2:30 pm: **DC and dynamic switching characteristics of field-plated vertical geometry β -Ga₂O₃ rectifiers (Invited Paper)**, Jiancheng Yang, Patrick Carey, IV, Fan Ren, Univ. of Florida (USA); Yen-Ting Chen, Yu-Ye Liao, National Chiao Tung Univ. (Taiwan); Chin-Wei Chang, Jenshan Lin, Univ. of Florida (USA); Marko Tadjer, U.S. Naval Research Lab. (USA); Stephen J. Pearton, Univ. of Florida (USA); David J Smith, ASU (USA); Akito Kuramata, Tamura Thermal Device Corp. (Japan) and Novel Crystal Technology, Inc. (Japan) [10919-35]

Coffee Break Tue 2:55 pm to 3:10 pm

SESSION 10

LOCATION: ROOM 302 (SOUTH LEVEL THREE) TUE 3:10 PM TO 4:45 PM

2D Materials and Quantum Structures

Session Chairs: **Vitaliy Avrutin**, Virginia Commonwealth Univ. (USA); **Adrián Hierro**, Univ. Politécnica de Madrid (Spain)

3:10 pm: **Electrical properties of BeMgZnO/ZnO heterostructures with high-density two-dimensional electron gas (Invited Paper)**, Kai Ding, Vitaliy Avrutin, Natalia Izyumskaya, Ümit Özgür, Hadis Morkoç, Virginia Commonwealth Univ. (USA) [10919-36]

3:35 pm: **Vertically coupling of ZnO nanorods on MoS₂ flakes (Invited Paper)**, Camilla Baratto, Istituto Nazionale di Ottica (Italy); Federica Rigoni, Lulea Univ. of Technology (Sweden); Maurizio Donarelli, Matteo Ferroni, Guido Faglia, Univ. degli Studi di Brescia (Italy) [10919-37]

4:00 pm: **Short infrared wavelength quantum cascade detectors based on m-plane ZnO/ZnMgO quantum wells (Invited Paper)**, François H. Julien, Univ. Paris-Sud (France) and Univ. Paris-Saclay (France); Arnaud Jollivet, Ctr. de Nanosciences et de Nanotechnologies (France); Borislav Hinkov, Technische Univ. Wien (Austria); Stefano Pirotta, Univ. Paris-Sud (France); Sophie Derelle, Julien Jaeck, ONERA (France); Maria Tchernycheva, Raffaele Colombelli, Adel Bousseksou, Ctr. de Nanosciences et de Nanotechnologies (France); Maxime Hugues, Nolwenn Le Biavan, Ctr. de recherche sur l'hétéroépitaxie et ses applications (France); Julien Tamayo-Arriola, Miguel Montes Bajo, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain); Gottfried Strasser, Technische Univ. Wien (Austria); Jean-Michel Chauveau, Ctr. de recherche sur l'hétéroépitaxie et ses applications (France); Adrián Hierro, Instituto de Sistemas Optoelectrónicos y Microtecnología (Spain) [10919-38]

4:25 pm: **Surface plasmon induced dramatic reflection reduction due to subwavelength coupling in indium-tin-oxide/lithium niobate**, Jingwen Zhang, Chao Wang, Yingce Wang, Hua Zhao, Harbin Institute of Technology (China) [10919-39]

SESSION 11

LOCATION: ROOM 302 (SOUTH LEVEL THREE) TUE 4:45 PM TO 6:20 PM

Plasmonics

Session Chairs: **Vitaliy Avrutin**, Virginia Commonwealth Univ. (USA); **Adrián Hierro**, Univ. Politécnica de Madrid (Spain)

4:45 pm: **ZnO plasmonic-waveguide nanolaser (Invited Paper)**, Jean-Jacques Delaunay, Ya-Lun Ho, Kenji Clark, Syazwan Kamal, The Univ. of Tokyo (Japan) [10919-40]

5:10 pm: **Shining light on oxide-based nanostructures: tunable plasmonics and spintronics (Invited Paper)**, Rosalia Serna, Johann Toudert, Antonio Mariscal, Instituto de Óptica "Daza de Valdés", Consejo Superior de Investigaciones Científicas (Spain) [10919-41]

5:35 pm: **Interface phonon-polaritons as an all-optical technique to assess the Mg content in ZnO/MgZnO multiple quantum wells (Invited Paper)**, Miguel Montes Bajo, Julien Tamayo-Arriola, José María Ulloa, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain); Nolwenn Le Biavan, Maxime Hugues, Jean-Michel Chauveau, Ctr. de recherche sur l'hétéroépitaxie et ses applications, CNRS (France) and Univ. Côte d'Azur (France); Adrián Hierro, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain) [10919-42]

6:00 pm: **Surface plasmon behaviors of highly-Ga doped ZnO**, Chang-Gan Tu, Yu-Feng Yao, Wen-Yen Chang, Chi-Wu Liu, Wai Fong Tse, Yeann-Wei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan) [10919-43]

OPTO



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Short infrared wavelength quantum cascade detectors based on non-polar ZnO/ZnMgO quantum wells (Invited Paper)

Paper 10919-38

Time: 4:00 PM - 4:25 PM

Author(s): Arnaud Jollivet, Ctr. de Nanosciences et de Nanotechnologies (France); François H. Julien, Univ. Paris-Sud (France), Univ. Paris-Saclay (France); Borislav Hinkov, Technische Univ. Wien (Austria); Stefano Pirota, Univ. Paris-Sud (France); Sophie Derelle, Julien Jaeck, ONERA (France); Maria Tchemycheva, Raffaele Colombelli, Adel Bousseksou, Ctr. de Nanosciences et de Nanotechnologies (France); Maxime Hugues, Nolwenn Le Biavan, Ctr. de recherche sur l'hétéroépitaxie et ses applications (France); Julien Tamayo-Arriola, Miguel Montes Bajo, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain); Gottfried Strasser, Technische Univ. Wien (Austria); Jean-Michel Chauveau, Ctr. de recherche sur l'hétéroépitaxie et ses applications (France); Adrian Hierro, Instituto de Sistemas Optoelectrónicos y Microtecnología (Spain)

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We report on the first demonstration of quantum cascade detectors based on ZnO/ZnMgO quantum wells grown by molecular beam epitaxy on an m-plane ZnO substrate. The sample is processed in the form of square mesas with special attention paid to the passivation of the side facets. Photocurrent spectroscopy reveals a resonance at 2.8 μm wavelength slightly blue-shifted with respect to the intersubband absorption peak at 3 μm wavelength. The photocurrent persists up to room temperature. The peak responsivity amounts to 0.15 mA/W under irradiation at Brewster's angle of incidence of the top surface of the mesas.

Surface plasmon induced dramatic reflection reduction due to subwavelength coupling in indium-tin-oxide/lithium niobate

Paper 10919-39

Time: 4:25 PM - 4:45 PM

Author(s): Jingwen Zhang, Chao Wang, Yingce Wang, Hua Zhao, Harbin Institute of Technology (China)

[Add To My Schedule](#) **Coffee Break 2:55 PM - 3:10 PM****Session 11:
Plasmonics**

Tuesday 5 February 2019

4:45 PM - 6:20 PM

Location: Room 302 (South Level Three)

Session Chairs: [Vitaliy Avrutin](#), Virginia Commonwealth Univ. (United States) ; [Adrián Hierro](#), Univ. Politécnica de Madrid (Spain)**ZnO plasmonic-waveguide nanolaser (Invited Paper)**

Paper 10919-40

Time: 4:45 PM - 5:10 PM

Author(s): Jean-Jacques Delaunay, Ya-Lun Ho, Kenji Clark, Syazwan Kamal, The Univ. of Tokyo (Japan)

[Add To My Schedule](#) **Shining light on oxide-based nanostructures: tunable plasmonics and spintronics (Invited Paper)**

Paper 10919-41

Time: 5:10 PM - 5:35 PM


Author(s): Rosalia Serna, Johann Toudert, Antonio Mariscal, Instituto de Optica "Daza de Valdés", Consejo Superior de Investigaciones Científicas (Spain)

[Add To My Schedule](#) **Interface phonon-polaritons as an all-optical technique to assess the Mg content in ZnO/MgZnO multiple quantum wells (Invited Paper)**

Paper 10919-42

Time: 5:35 PM - 6:00 PM

Author(s): Miguel Montes Bajo, Julien Tamayo-Arriola, José María Ulloa, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain); Nolwenn Le Biavan, Maxime Hugues, Jean-Michel Chauveau, Ctr. de recherche sur l'hétéroépitaxie et ses applications, CNRS (France), Univ. Côte d'Azur (France); Adrian Hierro, Instituto de Sistemas Optoelectrónicos y Microtecnología, Univ. Politécnica de Madrid (Spain)

[Add To My Schedule](#) **Surface plasmon behaviors of highly-Ga doped ZnO**

Paper 10919-43


Time: 6:00 PM - 6:20 PM

Author(s): Chang-Gan Tu, Yu-Feng Yao, Wen-Yen Chang, Chi-Wu Liu, Wai Fong Tse, Yean-Woei Kiang, Chih-Chung Yang, National Taiwan Univ. (Taiwan)

[Add To My Schedule](#) **WEDNESDAY 6 FEBRUARY**[Show All Abstracts](#)**Session 12:
Oxide-based Energy Harvesting and Solar I**

Wednesday 6 February 2019

8:00 AM - 9:55 AM

Location: Room 302 (South Level Three) Session Chairs: Magnus Willander, Linköping Univ. (Sweden) ; [Federico Rosel](#), Institut National de la Recherche Scientifique (Canada)**Multifunctional materials for emerging technologies (Invited Paper)**

(Canceled)