

2016 2nd AFRL Workshop on Beta-Ga2O3 Synthesis, Characterization and Applications

Drs. Gregg Jessen; Ken Goretta | December 12-13, 2016 | Arlington, VA

Basic Research Innovation and Collaboration Center (BRICC)
4075 Wilson Blvd., Suite 350 | Liberty Room
Arlington, VA 22203

Agenda Day 1 | December 12, 2016

Time	Title	Speaker
7:30	Registration	
8:00-8:10	Introduction and US Perspective	Dr. Gregg Jessen (AFRL)
8:10-8:20	Ga2O3 Fundamental Science Perspective	Dr. Ali Sayir (AFOSR)
8:20-8:40	The Rise of Ga2O3 for a New Era of Power Electronics	Dr. Masataka Higashiwaki (NICT Japan);
8:40-9:00	Growth of Homoepitaxial β -Ga2O3 Layers by MOVPE for Power Electronics Applications	Dr. Michele Baldini (IKZ Germany)
9:00-10:00	Epitaxy and Opportunities Afforded by Native Substrate Availability	Discussion Lead Prof. Jim Speck (UCSB): < 15 min + 45 min open discussion
10:00-10:10	BREAK	
10:10-11:10	Electronic Transport and Devices	Discussion Lead Prof. Debdeep Jena (Cornell): < 15 min + 45 min open discussion
11:10-12:25	LUNCH ON YOUR OWN	
12:25-13:25	Materials Characterization and Challenges	Discussion Lead Dr. Steve Ringel (OSD): <15 min +40 min open discussion
13:25-14:15	Modeling and Simulation	Discussion Leads Dr. Stefan Badescu (AFRL) and Dr. Eric Heller (AFRL): 10 min atomistic + 10 min device sim + 30 min open
14:15-14:15	BREAK	
14:25-15:05	Commercial Materials and Reactor Development	Open forum for providers of Bulk Substrates, Epitaxial Materials, Reactors with opening remarks by Dr. Akito Kuramata (NCT Japan)
15:05-15:35	Applications	Industry Application Discussion
15:35-17:00	Summary and Identification of Knowledge Gaps	Group Activity

17:00	MEETING ADJOURN FOR THE DAY	
17:45-19:45	Social: The Front Page 4201 Wilson Blvd., Arlington, VA 22203 703-248-9990	www.frontpagearlington.com

Technical Discussion Topics Day 1 December 12, 2016	
Topic	Speaker/Organization
Overview	
Introduction	G. Jessen, AFRL
Ga2O3 Fundamental Science Perspective	A. Sayir, AFOSR
The Rise of Ga2O3 for a New Era of Power Electronics	M. Higashiwaki, NICT
Growth of Homoepitaxial β -Ga2O3 Layers by MOVPE for Power Electronics Applications	M. Baldini, IKZ
Epitaxy and Opportunities Afforded by Native Substrate Availability	
Ga2O3 Materials Synthesis by MBE	J. Speck, UCSB
Non-polar GaN Epitaxy on (010) Ga2O3	Y. Cao, HRL
Synthesis and Characterization of LPCVD beta-Ga2O3 Films	H. Zhao, CWRU
CZ Growth of beta-Ga2O3	D. Thomson, AFRL
Electronic Transport and Devices	
Gallium Oxide Electronic Devices	D. Jena, Cornell
High-Voltage E-mode and High-Current D-mode FETs	K. Chabak, AFRL
Transport and Doping in Ga2O3 Transistors	S. Rajan, OSU
Electronic Transport Characterization of beta-Ga2O3	S. Mou, AFRL
Record Drain Currents on GOOI D/E-modes FETs	P. Ye, Purdue
Ga2O3 Schottky diodes on MBE and HVPE epi	A. Corrion, HRL
Ga2O3/Dielectric Interface Characterization and Transport in Ga2O3	U. Singiseti, U. Buffalo
Materials Characterization and Challenges	
Ga2O3 Materials Characterization	S. Ringel, OSU
Characterization of beta-Ga2O3 Contacts and Interfaces	L. Porter, CMU
Growth and Characterization of Homo- and Heteroepitaxial beta-Ga2O3 thin F films	M. Tadjer, NRL
Low-Ohmic Contact and Hall Sampling on MBE, VPE, LPCVD Materials	A. Green, WYLE
Characterization of b-Ga2O3 MOS Capacitors with High-k Dielectrics	C. Young, UT Dallas
Interfaces in Ga2O3 Power Semiconductor Devices	A. Yanguas-Gil, ANL
Thermal Characterization of Ga2O3 Schottky Barrier Diodes	S. Choi, Penn State
A thermodynamic approach to Ga2O3 contacts -Contacts and interfaces Interfaces	B. Peterson, U. Michigan
Modeling and Simulation	
Ga2O3 Atomistic Modeling	S. Badescu, AFRL
Device Level Modeling and Thermal Simulations with Sentaurus Device	E. Heller, AFRL

GW Results for beta-Ga ₂ O ₃ including Lattice Polarization Corrections and the Absorption Edge Anisotropy	W. Lambrecht, CWRU
Ab initio Simulations on Controlling the Conductivity in Ga ₂ O ₃	J. Varley, LLNL
Commercial Materials and Reactor Development	
Ga ₂ O ₃ Materials and Commercial Availability	A. Kuramata, NCT
	D. Hanser, Veeco
Growth of Bulk Single Crystal Gallium Oxide	K. Stevens, Synoptics
HVPE Capabilities and Ga ₂ O ₃ Growth Tool Development	J. Leach, Kyma
Ga ₂ O ₃ MOCVD Tool Hardware and Process Issues	G. Tompa, SMI
5 um per hour Growth Rates of High Quality b-GaO by MOCVD	A. Osinsky, Agnitron
Application	
High Voltage Amplifiers and Pulse Generators	S. Nelson, ENGIN-IC
Power Applications Enabled by UWBG	V. Mehrotra, Teledyne
Summary and Identification of Knowledge Gaps	

Agenda Day 2 December 13, 2016		
Time	Title	Speaker
7:30	Registration	
8:00	Rehash and Discussion on Application Space	This is a forum where non-proprietary application oriented discussions are encouraged and may include ITAR/EAR information.
9:00	Reserved by appointment	Filled
9:20	Reserved by appointment	Filled
9:40	Reserved by appointment	Filled
10:00	Break	
10:10	Reserved by appointment	Filled
10:30	Reserved by appointment	Filled
10:50	Reserved by appointment	Filled
11:10	Reserved by appointment	Filled
11:30	Break	
11:40	Gov't Caucus	Gov't only discussion on program coordination and technical direction
12:45	MEETING ADJOURN	