



## ECS Journal of Solid State Science and Technology

# Focus Issue: Wide Bandgap Power Semiconductors

Wide bandgap (WBG) power semiconductors, especially silicon carbide (SiC) and gallium nitride (GaN) offer unprecedented opportunities for transformative changes in the transmission, distribution, and utilization of electrical energy. Compared to the semiconductor silicon, SiC and GaN offer significantly higher electrical and thermal conductivities, increased avalanche breakdown field strength, and improved ruggedness under harsh environmental operating conditions. These basic material properties translate into more efficient power switching devices and more compact power electronic systems capable of reliably operating under harsh environmental conditions for prolonged duration. However, state-of-the-art commercial WBG power devices have limited voltage and current ratings, unproven field-reliability, and are prohibitively expensive. A high density of crystal defects in the material, limited wafer size, and high wafer cost prevent the realization of full potential of WBG power devices. Significant breakthroughs in the current crystal growth technology or radically new material growth approaches are needed in order to “unlock” the full potential of WBG power devices in commercial, military and space power electronics.

Prospective authors are invited to submit original contributions, or survey papers, for review for publication in this Focus Issue on Wide Bandgap Power Semiconductors. Topics of interest include, but are not limited to:

- Growth chamber design and modeling
- Materials characterization and modeling
- Thermal conductivity enhancement techniques
- On-axis vs. off-axis crystal growth
- Novel bulk crystal growth techniques
- Gate dielectric and surface passivation
- Material effects on power devices
- Growth kinetics and modeling
- Substrate effects on material quality and cost
- Crystal defect reduction techniques
- Thin film vs. thick film growth
- Novel epitaxial film growth techniques
- Metal/silicide contact technology
- WBG metrology

Papers submitted and presented at the ECS Symposium on GaN and SiC Power Technologies are particularly welcome.

All manuscripts must be submitted at: <http://ecsjournals.msubmit.net/cgi-bin/main.plex>. Submissions must be clearly marked “JSS Special Issue on Wide Bandgap Power Semiconductors” on the cover page. When preparing your paper, please make sure that you follow author instructions for *ECS J. Solid State Science and Technology* posted at [http://www.electrochem.org/images/pdf/author\\_instructions\\_jss.pdf](http://www.electrochem.org/images/pdf/author_instructions_jss.pdf). Manuscripts submitted for the special issue will be reviewed separately and will be handled by Technical Editors **Stefan DeGendt** and **Yue Kuo**, in collaboration with the guest editors listed below.

**Deadline for submission of manuscript: March 31, 2013**

**Scheduled Publication Time: Spring 2014**

### Guest Editors

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#### Timeline

Manuscript submission deadline.....	March 31, 2013
First review completed and authors notified .....	June 30, 2013
Final revised manuscript received .....	August 31, 2013
Authors notified of paper acceptance .....	September 30, 2013
Accepted manuscripts forwarded to ECS for publication.....	December 31, 2013
Special issue publication.....	Spring 2014