

## Program Schedule

### 4th International Workshop on Bulk Nitride Semiconductors 2006

---

#### Tuesday, October 17<sup>th</sup>, 2006

4:00 p.m. **Registration**

6:30 p.m. **Welcome Party** at Makino Prince Hotel

#### Wednesday, October 18<sup>th</sup>, 2006

7:15 a.m. – 8:45 a.m. **Breakfast**

**Session 1: Ammonothermal growth (9:00 a.m. – 10:25 a.m.)** **Chair: Z. Sitar**

9:00 a.m. – 9:15 a.m. **Welcome and orientation**

9:15 a.m. – 9:45 a.m. **Tsuguo Fukuda (Scene setter)**: Prospects for Ammonothermal Growth of large GaN crystals

9:45 a.m. – 10:05 a.m. **Tadao Hashimoto**: Seeded growth of GaN by the basic ammonothermal method for realization of low-cost, high-quality bulk GaN crystals

10:05 a.m. – 10:25 a.m. **Michael Callahan**: Ammonothermal Growth of Group-III Metal Nitride Alloys

10:25 a.m. – 10:55 a.m. **Break**

**Session 2: AlN growth by sublimation (10:55 a.m. – 12:05 p.m.)** **Chair: D. Hanser**

10:55 a.m. – 11:25 a.m. **Boris Epelbaum (Scene setter)**: Similarities in sublimation growth of SiC and AlN: How AlN can learn from mature SiC technology

11:25 a.m. – 11:45 a.m. **Zlatko Sitar**: Seeded growth of AlN crystals

11:45 a.m. – 12:05 p.m. **Heikki Helava**: Some Key Issues in Growth of Large AlN Crystals

12:05 p.m. – 1:30 p.m. **Lunch** in Makino Prince Hotel

**Session 3: GaN growth from solution (1:30 p.m. – 2:40 p.m.)** **Chair: S. Porowski**

1:30 p.m. – 2:00 p.m. **Hisanori Yamane (Scene setter)**: Single crystal growth of GaN by heating a Ga melt in Na-N<sub>2</sub> atmosphere

2:00 p.m. – 2:20 p.m. **Elke Meissner**: Study of the kinetics of the formation reaction of GaN from a solution under ammonia atmosphere

2:20 p.m. – 2:40 p.m. **Yusuke Mori**: Growth of GaN single crystal using the liquid phase epitaxy technique

2:40 p.m. – 3:10 p.m. **Break**

**Session 4: AlN and related alloys 1 (3:10 p.m. – 4:10 p.m.)** **Chair: V. Dmitriev**

3:10 p.m. – 3:30 p.m. **Akira Usui**: HVPE Growth of AlGa<sub>x</sub>N Layers on Sapphire Substrates

3:30 p.m. – 3:50 p.m. **Hideto Miyake**: Growth of thick AlN film with atomic step structure by low-pressure HVPE

3:50 p.m. – 4:10 p.m. **Akinori Koukitsu**: HVPE growth of Al<sub>x</sub>Ga<sub>1-x</sub>N ternary alloy using AlCl<sub>3</sub> and GaCl

7:30 p.m. – 8:30 p.m. **Dinner** in Makino Prince Hotel

## Thursday, October 19<sup>th</sup>, 2006

7:15 a.m. – 8:45 a.m. **Breakfast**

### Group Outing

9:30 a.m. – **Group Outing:** We will enjoy a walk and sightseeing.  
Makino Prince Hotel → (Bus) → An avenue of redwoods (a Walk) → (Bus) → Makino Highland → (Bus) → Makino Prince Hotel (**Lunch**) → 12:55 a.m.(Ship) → Chikubu Isle (a Walk) → (Ship) → Hikone Port → Hikone Japanese Castle → (Bus) → 5:30 p.m. – 7:30 p.m. **Dinner** at Hikone Castle Hotel → (Bus) → 9:00 p.m. **Arrival** at Makino Prince Hotel

## Friday, October 20<sup>th</sup>, 2006

7:15 a.m. – 8:45 a.m. **Breakfast**

### Session 5: Devices (9:00 a.m. – 10:10 a.m.) Chair: J. Freitas

- 9:00 a.m. – 9:30 a.m. **David Storm (Scene setter):** MBE growth of AlGa<sub>0.2</sub>N/GaN on free-standing GaN substrates for microwave device applications
- 9:30 a.m. – 9:50 a.m. **Sylwester Porowski:** High power continuous wave InGa<sub>0.2</sub>N laser diodes on grown bulk GaN substrates using Plasma Assisted Molecular Beam Epitaxy
- 9:50 a.m. – 10:10 a.m. **Detlef Hommel:** Homoepitaxial UV laser diodes grown on free standing HVPE-GaN substrates

10:10 a.m. – 10:40 a.m. **Break**

### Session 6: AlN and related alloys 2 (10:40 a.m. – 12:00 p.m.) Chair: F. Hasegawa

- 10:40 a.m. – 11:00 a.m. **Vladimir Dmitriev:** Recent progress in HVPE growth of GaN, AlN, InN, and their alloys
- 11:00 a.m. – 11:20 a.m. **Toru Nagashima:** Improvement of AlN crystalline quality with high epitaxial growth rate by hydride vapor phase epitaxy
- 11:20 a.m. – 11:40 a.m. **Misaichi Takeuchi:** Improvement of crystalline quality for Al- and N-polar AlN layers by modified flow-modulation MOCVD growth
- 11:40 a.m. – 12:00 p.m. **Yoshinao Kumagai:** Polarity dependence of AlN {0001} decomposition in flowing H<sub>2</sub>

12:00 p.m. – 1:30 p.m. **Lunch** in Makino Prince Hotel

### Session 7: GaN HVPE 1 (1:30 p.m. – 2:40 p.m.) Chair: I. Grzegory

- 1:30 p.m. – 2:00 p.m. **Drew Hanser (Scene setter):** Wafering and surface preparation of bulk GaN boules and substrates
- 2:00 p.m. – 2:20 p.m. **Tanya Paskova:** Thermally induced strain and bending in HVPE grown GaN films studied by HRXRD at variable temperatures
- 2:20 p.m. – 2:40 p.m. **Kensaku Motoki:** GaN Substrate with Low Dislocation Density by Advanced-DEEP

2:40 p.m. – 3:10 p.m. **Break**

### Session 8: Characterization 1 (3:10 p.m. – 4:20 p.m.) Chair: D. Hommel

- 3:10 p.m. – 3:40 p.m. **Jan Weyher (Scene setter):** Recognition of crystallographic and chemical (electronic) non-homogeneities in thick homo-epitaxial quasi-bulk GaN layers
- 3:40 p.m. – 4:00 p.m. **Jaime Freitas:** Residual impurities in GaN substrates and epitaxial layers Grown by various Techniques
- 4:00 p.m. – 4:20 p.m. **James Yesinowski:** New <sup>69</sup>Ga and <sup>71</sup>Ga Nuclear Magnetic Resonance (NMR) Approaches to the Characterization of Bulk GaN

7:30 p.m. – 8:30 p.m. **Dinner** in Makino Prince Hotel

## Saturday, October 21<sup>st</sup>, 2006

7:15 a.m. – 8:45 a.m. **Breakfast**

### Session 9: Growth by other methods (9:00 a.m. – 10:10 a.m.) **Chair: Y. Mori**

9:00 a.m. – 9:30 a.m. **Boris Feigelson (Scene setter)**: New approaches for bulk Nitrides growth from solution

9:30 a.m. – 9:50 a.m. **Michal Boćkowski**: Platelets and needles. Two habits of pressure grown GaN crystals

9:50 a.m. – 10:10 a.m. **Tadashi Ohachi**: RF-MBE growth of 2H-AIN templates by using a mode change MEE on Si(111) for HVPE growth

10:10 a.m. – 10:40 a.m. **Break**

### Session 10: Characterization 2 (10:40 a.m. – 11:40 p.m.) **Chair: D. Storm**

10:40 a.m. – 11:00 a.m. **Jaime Freitas**: Properties of Fe-doped semi-insulating GaN substrates for high-frequency device fabrication

11:00 a.m. – 11:20 a.m. **Martin Albrecht**: Deep and shallow defects in semi-insulating and Si-doped AIN bulk crystals

11:20 a.m. – 11:40 a.m. **Antonio Ferreira da Silva**: Linear optical response of zinc-blende and wurtzite III-N (III = B, Al, Ga, and In)

12:00 a.m. – 1:30 p.m. **Lunch** in Makino Prince Hotel

### Session 11: GaN HVPE 2 (1:30 p.m. – 3:00 p.m.) **Chair: Y. Kumagai**

1:30 p.m. – 2:00 p.m. **Izabella Grzegory (Scene setter)**: Non-polar GaN substrates sliced from GaN bulk crystals

2:00 p.m. – 2:20 p.m. **Bernd Schineller**: Methods for Industrial Scale Production of Free-Standing GaN Substrates

2:20 p.m. – 2:40 p.m. **Hyun-Min Shin**: Growth and Characterization of Non-Polar Single Crystalline Gallium Nitride Thick Films

2:40 p.m. – 3:00 p.m. **Boleslaw Łuczniak**: Crystallization of Bulk GaN by HVPE on Pressure Grown Needles Shaped Seeds

3:00 p.m. – 3:30 p.m. **Break**

### Special Session: (3:30 p.m. – 4:30 p.m.) **Chair: D. Hanser**

One hour round table discussion on “Large Area Nitride Substrates” is planned.

### Closing remark: (4:30 p.m. – 5:00 p.m.)

4:30 p.m. – 5:00 p.m. **Closing remark**

7:00 p.m. – 9:00 p.m. **Banquet** in Makino Prince Hotel

## Sunday, October 22<sup>nd</sup>, 2006

7:15 a.m. – 8:45 a.m. **Breakfast / Check out**

9:00 a.m. – **Transport to IWN conference site in Kyoto**

**(take a side trip on the way to Kyoto including Lake Biwa Museum)**