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文部科学省科学研究費助成事業「新学術領域研究」2016－2020年度
特異構造の結晶科学
完全性と不完全性の協奏で拓く新機能エレクトロニクス

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特異構造トピックス

The 9th Asia-Pacific Workshop on Widegap Semiconductors (APWS 2019) 開催

2019 年 11 月 10-15 日、沖縄科学技術大学院大学にて本領域共催の国際会議 APWS2019 が開催されました。

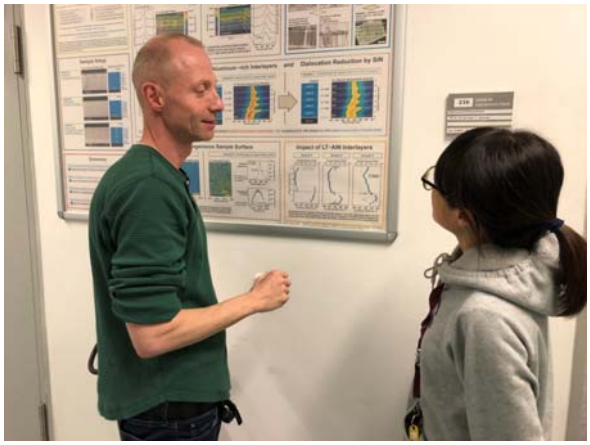
若手研究者海外派遣事業 活動報告

Xiao Shiyu 助教（三重大学・A01-2）
派遣先研究機関：Otto von Guericke University Magdeburg (ドイツ)
Institute of High Pressure Physics Polish Academy of Sciences（ポーランド）

During 9/17 to 12/4, I visited Professor Jüergen Christen's and Professor Michal Bockowski's laboratories in Otto von Guericke University Magdeburg (OVGU) and Institute of high pressure physics of polish academic science (UNIPRESS), respectively.

Professor Christen is the pioneer in cathodoluminescence characterization of semiconductors. In his lab, there are SEM-CL and STEM-CL which is rare in the world. The SEM-CL not only could measure the luminescence properties but also could conduct time-resolved cathodoluminescence measurement for characterize carrier lifetime. Meanwhile, the STEM-CL could effectively characterize luminescence properties on microscale, such as multiple quantum wells. Our lab recently focuses on the development deep UV LEDs. In order to improve the efficiency of LEDs, it is extremely crucial to characterize luminescence properties of our samples with the corporation of Professor Christen. During my stay in Professor Christen's lab, I received safety training and get the license for the operation of SEM-CL. The luminescence properties of MQW structures grown on high-quality anneal sputter-deposited AlN templates fabricated by our lab were characterized by SEM-CL and STEM-CL. The results are going to be summarized and used for a publication. Moreover, Professor Christen and our lab will apply grant next year for the future corporation and close connection.

As we known, UNIPRESS is famous for



Dr. Frank Bertram (Otto von Guericke University Magdeburg)

Professor Izabella Grzegory (UNIPRESS)

crystal growth. During the stay in Professor Michal Bockowski's laboratories, I learned GaN and AlGaN growth by hydride vapor phase epitaxy (HVPE). These experiences are very beneficial for AlN HVPE growth in our lab. Meanwhile, Professor Michal Bockowski and we are going to conduct GaN and AlGaN growth on high quality annealed sputter-deposited AlN templates we offered. Moreover, I visited high-pressure lab, Ammono Company and other MOCVD growth labs. It is my honor to have chance to discuss with Professor Izabella Grzegory.

After back to Japan, the luminescence results would be feedback for the efficiency improvement of LED structure. The experience of stay in UNIPRESS is helpful for the AlN HVPE growth and the reactor optimization. The most important thing is that cooperation and close connection were built.

今後の予定

[シンポジウム]
第 67 回応用物理学会春季学術講演会「窒化物半導体特異構造の科学　～実験と理論の接点を探る：物性解明と制御～」
開催日：2020 年 3 月 12 日
会場：上智大学 四谷キャンパス

大久保 忠勝（NIMS）
STEM/3DAP による GaN のナノ組織解析
白石 賢二（名大）
GaN 中のらせん転位-不純物複合体の第一原理量子論による考察
柴田 直哉（東大）
微分位相コントラスト STEM による材料界面電磁場解析
石谷 善博（千葉大）
電子-フォノン相互作用およびフォノン輸送のミクロ評価
中村 芳明（阪大）
特異構造を用いたフォノン輸送制御と熱電応用
渡邉 聡（東大）
機械学習ポテンシャルを用いた窒化物半導体の研究―フォノン・熱伝導を中心に―

[共催国際会議]
The 8th Asian Conference on Crystal Growth and Crystal Technology (CGCT-8)
https://cgct-8.com

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