



Metal oxide based Semi-conductors for sustainability and sensing based applications

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Current status/stage of your JDP: Completed Comprehensive Exam,
Completed 3 semester at NYCU, Overall completed 3.5 years

- **Highlights**
- High quality epitaxial films grown on the sapphire by metal organic chemical vapor deposition (MOCVD).
- Fabrication of Zinc Gallium oxide based X-ray and Solar blind photodetectors.
- E-mode phototransistor with high U-V rejection ratio.
- MOSFET fabrication with different channel lengths.
- **Significant Achievements**
- *“Direct hard X-ray photodetector with superior sensitivity based on ZnGa₂O₄ epilayer grown by metalorganic chemical vapor deposition”* **Siddharth Rana**, Shang-Jui Chiu, Chih-Yang Huang, Fu-Gow Tairtan, Yan-Gu Lin, Dong-Sing Wu, **Jitendra Pratap Singh**, Guang-Cheng Su, Po-Liang Liu, **Ray-Hua Horng** (<https://doi.org/10.1016/j.mtadv.2023.100411>).
- **S. Rana**, F. -G. Tarntair, **J. P. Singh** and **R. -H. Horng**, "Effect of the forming gas annealing on the Zinc Gallium Oxide based Deep UV photodetector characteristics grown by metalorganic chemical vapor deposition," 2023 IEEE Photonics Conference (IPC), Orlando, FL, USA, 2023, pp. 1-2, (doi: 10.1109/IPC57732.2023.10360768.)
- *“E-Mode Phototransistor with enhanced UV-Visible rejection ratio based Zinc Gallium Oxide grown by metalorganic chemical vapor deposition”* **Siddharth Rana**, **Jitendra Pratap Singh** and **Ray-Hua Horng** (**Best Poster ISPE 2023 Paper presentation**).
- *Best Paper in Journal award by NSTC*

