

Tutorial 1**14:00-15:00**
Room C (301)

Organizer	Young Joon Hong (Sejong Univ., Korea)
Speaker	Young Joon Hong (Sejong Univ., Korea)
Topic	Semiconductor Light-Emitting Devices
Session Title	Epitaxy of Thin-Film and Sub-Micron Light-Emitting Diodes for High Definition Display Applications

Development of flat panel displays has been rapidly accelerated by introducing new materials, such as liquid crystal, organic (or plastic) light emitting diodes, and semiconductor light-emitting diodes (LEDs). Among these materials, compound semiconductor LEDs have recently started to be utilized as light emission pixel in commercial displays of 'The Wall' by Samsung since 2019, because of excellent physical properties of high quantum efficiency, long term stability, and ease of miniaturization. This tutorial begins with providing a general overview of the materials, fabrication process, and required performances of LEDs for display applications. Then, we mainly focus to the epitaxial growth of GaN-based LEDs, especially, metal-organic vapor phase epitaxy (MOVPE), which is one of the most productive technique for fabricating high performance LEDs. The fundamentals to the MOVPE technique are dealt with explaining the brief development history of GaN-based InGaN LEDs. Doping, heterostructures (i.e. quantum wells), selective growth and epitaxial lateral overgrowth, and nanorod growth are lectured in depth. The recent issues for the miniaturization of LEDs for the micro-LED display applications are discussed. Finally, the strengths of thin film and nanorod LEDs grown by the MOVPE are compared with respect to the performance, fabrication process, and pixelization for future high definition display applications.