

# AMOLED TV Non-thermal Repair Technology

Dr. Seonghak Cho  
Department of Laser & Electron Beam Application  
T. +82 - 42 - 868 - 7077  
E. shcho@kimm.re.kr

⇒ Ultrashort pulse laser-based AMOLED TV non-thermal repair technology and repair device

### Client / Market

- Companies interested in non-thermal repair machining technology of large size AMOLED panel

### Necessity of this Technology

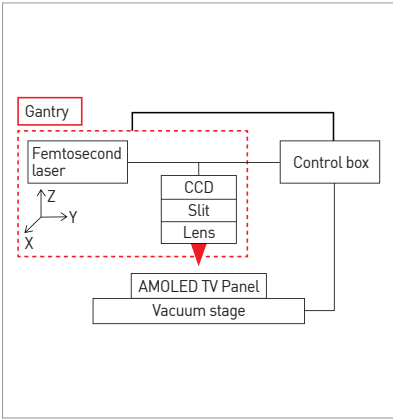
- Non-thermal repair process is necessary, and a system for large size processing needs to be established.
- Repair process using nanosecond laser inevitably causes thermal damage to the object.
- In case of processing an organic matter that is very sensitive to the processing temperature, unnecessary damages are caused from heat around the processing unit.
- When defect or error occurs during large size AMOLED panel manufacturing, the entire quantity is discarded. From the production yield perspective, this is a serious downside, therefore a repair technology is needed.

### Technical Differentiation

- Ultrashort pulse laser has relatively short pulse width compared to nanosecond laser and can be used for non-thermal processing to minimize damage from heat on the object.
- With the ultrashort laser machining system using a gantry, a large size AMOLED panel can be repaired.
- The beam size can be adjusted with the motorized slit to adjust the beam shape in the light path of the ultrashort pulse laser-based machining system, and with the square-shaped beam, machining of area requiring repair can be executed with the minimum line width of 500 nm.
- Using the gantry established for this system, the defective area of the large size AMOLED panel is detected and is quickly repaired using the ultrashort pulse laser.

### Excellence of Technology

- The process irradiates the femtosecond laser beam to the target layer and processes the desired area. It is utilized for partial repair of a specific defective area.
- For this, the beam shape and the machining size is adjusted through the slit.



### DESIRED PARTNERSHIP

Technology Transfer

Licensing

Joint Research

Other

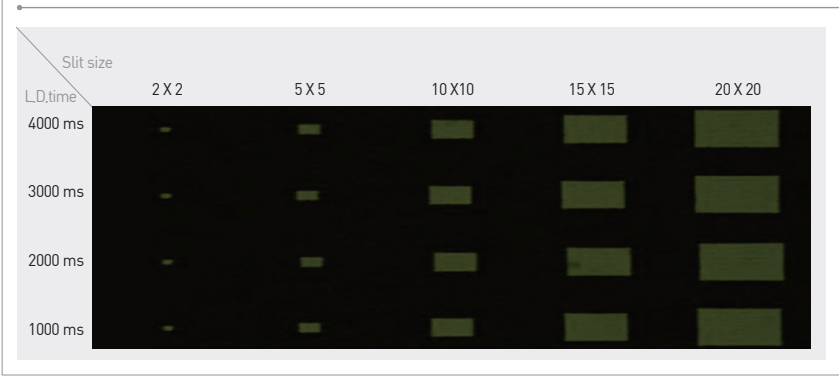


### TECHNOLOGY READINESS LEVEL [TRL]



- It is the blueprint that roughly shows the active organic self-illuminator TV's femtosecond laser repair system. For large area repair, the gantry system is used to adjust the laser beam location, not the target for repair, for machining.
- The repair target is fixed with the vacuum chuck of the stage to minimize the elevation difference error.
- The head researcher for this technology has over 10 years of research experience in ultrashort femtosecond laser-applied superprecision micro machining field.

Example of Slit Machining



### Current Intellectual Property Right Status

#### PATENT

- Non-thermal Repair Method and Device for Full HD High Resolution Mobile Active Organic Self-illuminator (KR1477005)
- Non-thermal Repair Method and Device for Active Organic Self-illuminator Using Selective Pulse Width Tunable Laser (KR1450767)
- Thermal and Non-thermal Converged Repair Device for Active Organic Self-illuminator (KR1387996)
- Non-thermal Repair Method and Device for Transparent Active Organic Self-illuminator Using Ultrashort Pulse Laser (KR2012-0042367)
- Non-thermal Repair Method and Device for Large Size Active Organic Self-illuminator Using Ultrashort Pulse Laser (KR2012-0056576)
- Non-thermal Repair Method and Device for Active Organic Self-illuminator Using Ultrashort Pulse Laser (KR2012-0016303)
- Non-thermal Repair Method and Device for Flexible Active Organic Self-illuminator Using Ultrashort Pulse Laser (KR2012-0016139)