

# MOCVD — LED CHIPS

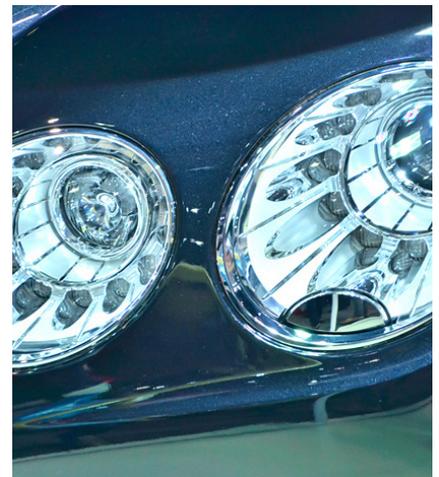
## THE OPPORTUNITY

LED chips are typically grown on sapphire or SiC substrates. One of the most important process parameters in the growth of the chips is temperature.

Indium incorporation is highly process-temperature-dependent (with III/V ratio being the other important factor). It is therefore very desirable to control the substrate temperature during Multiple Quantum Well (MQW) growth. The traditional solution for temperature instrumentation on the process side (wafer side) was an Emissivity Corrected Pyrometer (ECP). However, with the typical wafers used in this application, the ECP measures the susceptor temperature instead of the substrate temperature. That works quite well if the front side of the substrate is polished and the substrate remains flat during process.

During real processes, the wafer can lift slightly on one side in some reactors and can bow in most reactors. That creates temperature non-uniformity on the substrate. Unfortunately, the non-uniformity cannot be detected by ECP in case infrared-transparent substrates. The measurement from an ECP therefore could mislead the MOCVD reactor user in true substrate temperature.

In recent years, Patterned Sapphire Substrate (PSS) has been widely adopted in production. With the patterned surface, an ECP loses its accuracy in reflectance measurement and, in turn, loses the accuracy in temperature measure even on the susceptor.



## OUR SOLUTION

By taking advantage of the opaqueness of the GaN epi layer, a pyrometer working near or below 400 nm would be able to measure the substrate temperature accurately.

Advanced Energy offers a proven UV pyrometer that is also affordable. The data from our UV 400 shows a very linear temperature – PL relationship, which is not available with ECP. The UV 400 is the solution that enables yield enhancement and quality control in the very competitive LED chip market. Advanced Energy can help customers with different levels of implementation needs.



## YOUR BENEFITS

- True wafer temperature measurement instead of susceptor temperature measurement
- Accurate temperature measurement on PSS
- Linear growth temperature – wavelength relationship
- Enables yield improvement



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## PRECISION | POWER | PERFORMANCE

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