

## IQE equips complete fab with LayTec tools for MOCVD process monitoring

We are proud to announce that IQE plc has purchased a large number of LayTec's latest metrology systems for a fab-wide MOCVD process control. In close collaboration with IQE, we have implemented automated and highly precise new analysis algorithms into our Gen3 metrology tools, which utilize an updated XRD gauged high temperature nk database of AlGaAs (see [www.laytec.de/GaAs](http://www.laytec.de/GaAs)). This was the key to meet the demands of the world's leading compound semiconductor wafer foundry. With LayTec's in-situ metrology, the MOCVD systems of the fab can be tuned much faster to new and usually complex processes for best serving IQE's large customer base.

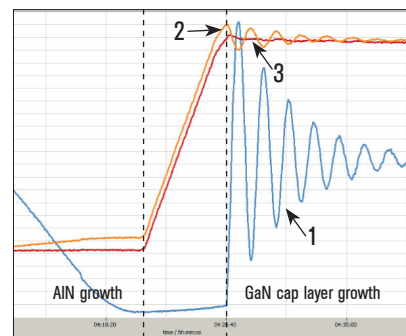
Matthew Geen, Engineering & Operations Director at IQE commented: "As the global leader in wafer outsourcing IQE

is committed to deliver the highest product quality standards to its customers. LayTec's new unrivalled growth process analysis offers a compelling alternative to expensive calibration runs by enabling us to extract material parameters in-situ during production."

According to LayTec's CTO Dr. Kolja Haberland: "LayTec is delighted to have worked closely with IQE, the world leading outsource manufacturer of epiwafers, to demonstrate the most advanced in-situ monitoring solutions and new algorithms for analysing critical growth parameters in a high volume, semiconductor manufacturing environment. Our systems cover a complete range of thin-film applications, providing access to all significant thin film growth parameters."

## Pyro 400 Gen3 ECP – emissivity corrected GaN temperature

Ultra-violet (UV) pyrometers like Pyro 400 have to collect very low intensity thermal emission in the UV region from the GaN buffer layers. Until recently, emissivity correction was not possible for low noise UV temperature measurement and Fabry-Perot oscillations (FPOs) in the temperature signal were unavoidable. However, LayTec's new Pyro 400 Gen3 is now the first UV pyrometer with full emissivity correction. It uses a separate UV broad-band reflection for emissivity correction and the three narrow-band reflectance channels of EpiTT (405/633/950nm) remain in full operation. The system is now available for Aixtron G4/G5 planetary reactors and Veeco Epik 700 reactors. Fig. 1 shows a "stress test" on a Veeco Epik 700 reactor of a leading LED manufacturer: maximum FPOs were generated by growing a 40 nm AlN marker layer on the GaN buffer



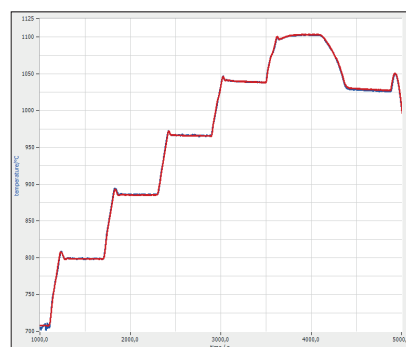
**Fig. 1:** Pyro 400 Gen3 on Veeco Epik 700: (1) – UV reflectance (broad band) for Emissivity Corrected Pyrometry (ECP); (2) – Pyro 400 raw data with FPOs; (3) – Pyro 400 Gen3 temperature signal with basically no remaining FPO artifacts in the temperature signal.

layer with subsequent overgrowth by a GaN cap layer. This caused large FPOs both in UV reflectance and thermal UV emission during GaN cap layer growth. These FPO artifacts are fully removed by Pyro 400 Gen3. Learn more at [www.laytec.de/gen3](http://www.laytec.de/gen3).

## AbsoluT 400 calibration to the PTB certified wafer temperature

LayTec's patented AbsoluT technology currently keeps wafers in about 750 MOCVD systems world-wide at the absolute temperature scale of the National Metrology Institute of Germany (PTB). This makes LayTec's EpiTTs calibrated by AbsoluT the tool of choice for emissivity corrected near infra-red pyrometry, wherever it is applicable. For GaN epitaxy on sapphire and SiC, however, EpiTT yields the pocket temperature instead of wafer temperature. So, only UV pyrometry can sense the wafer temperature. Therefore, our latest Pyro 400 Gen3 also comes to the market with a brand-new calibration tool: AbsoluT 400!

Fig. 2 shows the qualification result on a planetary reactor with two viewports: independently calibrated emissivity corrected pyrometers Pyro 400 Gen3 (calibrated by AbsoluT 400) and EpiTT (calibrated by the established AbsoluT 950) give exactly the same wafer temperature. Find more at [www.laytec.de/absolut400](http://www.laytec.de/absolut400).



**Fig. 2:** Two emissivity corrected pyrometers detecting the wafer temperature of a bare silicon wafer in a G3 planetary reactor with two viewports. View-port #1: ECP sensing at 950 nm by EpiTT Gen3 calibrated by AbsoluT 950 (red line). View-port #2: ECP sensing in the UV range by Pyro 400 Gen3 calibrated by AbsoluT 400 (blue line).

You can meet us at the following workshops, conferences and trade fairs:

4–8 July 2016 | ICEM 2016 | Suntec, Singapore | Talk: In-situ Metrology for Advanced Device Fabrication in Semiconductor Epitaxy

10–15 July 2016 | ICMOVPE-XVIII | San Diego, CA, USA | Booth 11

11 July 2016 | LayTec In-situ Seminar in conjunction with ICMOVPE | San Diego, CA, USA | You are welcome to register for our seminar [here](#) >