LAYTEC
Knowledge is key
NEWSLETTER: November 5, 2013

EPISTAR Corp. qualifies LayTec's Pyro 400 for GaN LED production

LayTec is proud to announce that Epistar Corp. has qualified LayTec's in-situ metrology system Pyro 400 for its GaN LED production. The worldwide leading LED manufacturer based in Taiwan will now use high accuracy GaN surface temperature sensing with Pyro 400.

The head of the Epitaxy Engineering Division at Epistar commented: „We are satisfied with GaN surface temperature measurement provided by Pyro 400. The tool helps us further improve MOCVD controllability and LED production yield.“

Mr. Tom Thieme, director marketing & sales at LayTec, commented, "We thank the team at Epistar for working together with LayTec's application engineers so closely. Through collaboration with this important and innovative customer, we have established our UV pyrometry tool in Epistar's daily LED production application. We successfully demonstrated that precise wafer surface temperature control gives room for even further LED yield improvement and cost reduction." Find more about Pyro 400 at www.laytec.de/pyro400.

HVPE GaN growth taken under control by EpiCurve® TT

Hydride vapor phase epitaxy (HVPE) is a very common way to grow thick GaN layers (1 mm and more). A major challenge is the bowing of the free-standing GaN after its self-separation from the sapphire substrate. Martin Klein and his colleagues at Ulm University in Germany have proved that the initial strain of the MOVPE template has a great impact on the final bowing of HVPE samples and on the remaining curvature of separated GaN wafers. [1]

To optimize the template conditions, researchers in Ulm used in their MOVPE process a combination of an oxygen-doped AlN nucleation layer, GaN buffer and a sub-monolayer of SiN_x mask. With LayTec's in-situ system EpiCurve® TT, they monitored the related curvature changes already during growth (Fig. 1). By variations of the growth conditions of the AlN nucleation and the subsequent GaN buffer layer, the curvature of the templates could be varied between tensile and compressive strain. Under optimized conditions, a fairly flat template could be produced (Case C), thereby being optimized for the subsequent HVPE growth.

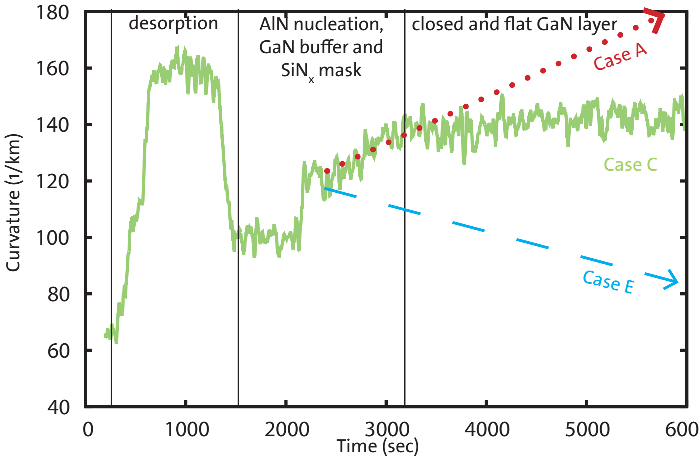

Fig. 1: In-situ curvature measurements during MOVPE template growth on sapphire. A, C, E correlate to Fig. 2.

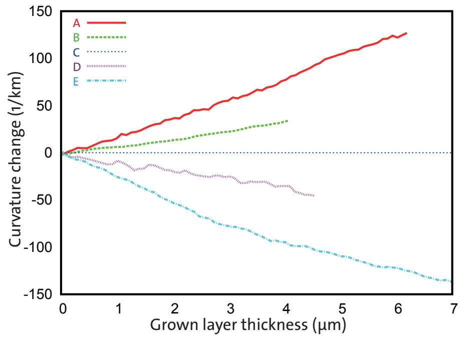

Fig. 2:
In-situ curvature data during overgrowth in HVPE.
Lines A–E: identical growth runs on different templates.

Fig. 2 shows EpiCurve® TT measurements during the subsequent HVPE growth. Lines A, C, E refer to the related template procedures in Fig. 1. B and D relate to intermediate AlN buffer thickness. All samples showed the same HVPE curvature evolution as their MOCVD templates. In the end, the final separated GaN layers grown on optimized C-type templates had low curvature values (100-200 km^{-1}) regardless their thickness.

As the next step, applying their newly acquired deep understanding of the MOCVD/HVPE strain effects, researchers in Ulm plan to use pre-curved sapphire wafers as templates to produce GaN wafers with zero bow. We are looking forward to further in-situ curvature data measured by EpiCurve® TT in this HVPE application!

[1] M. Klein in Annual Report 2012, University of Ulm, pp. 83-90 - www.uni-ulm.de/in/opto/forschung/jahresberichte.html

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

10 – 12 November 2013 | 10th China International Forum on Solid State Lighting - China SSL | Beijing, China | www.sslchina.org

19 – 21 November 2013 | Strategies in Light Europe | Munich, Germany | www.sileurope.com

5 – 6 December 2013 | DGKK Workshop | Ilmenau, Germany | www.tu-ilmenau.de/pv/dgkk2013