LayTec's 23rd in-situ seminar – a satellite workshop of EWMOVPE 2019 in Vilnius

With 56 attendees, our in-situ metrology seminar was once more a well-attended and scientifically educative event. We are proud that the EWMOVPE international advisory committee granted it "satellite workshop" status. This newsletter highlights the content of the three talks presented.

In-situ metrology enabling InP-based MOCVD on Si / SiO_2 substrates for silicon photonics

Jean Decobert of III-V labs (France) presented latest results on application of in-situ metrology for integration of III-V processes into silicon photonics structures. The regrowth of ternary and quaternary layers on Si / SiO_2 / InP is challenging because of different strain and wafer temperature conditions as compared to InP substrates.

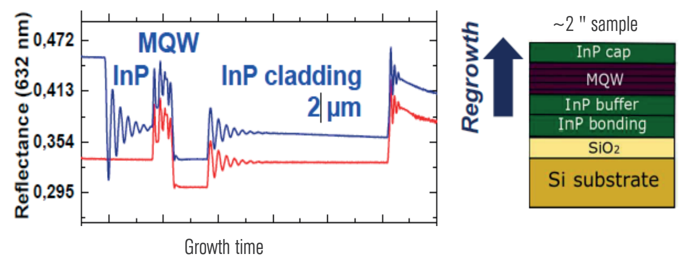

Fig. 1 LayTec's EpiCurveTT helped to transfer the process to this new type of substrate for silicon photonics. This figure compares the R632 nm reflectance signatures of regrowth on Si / SiO_2 / InP (blue line) with reference growth on InP substrate (red line). For Jean Decobert's talk, please click here.

Short wavelength (280 nm) reflectance enables quantitative analysis of UV-LED growth

Arne Knauer of Ferdinand-Braun-Institute (Germany) highlighted the advantages of the new 280 nm reflectance capability of EpiTT. With newly developed analysis algorithms (available with EpiNet 2020) he was able to significantly speed up his research work on novel UV-LED device structures.

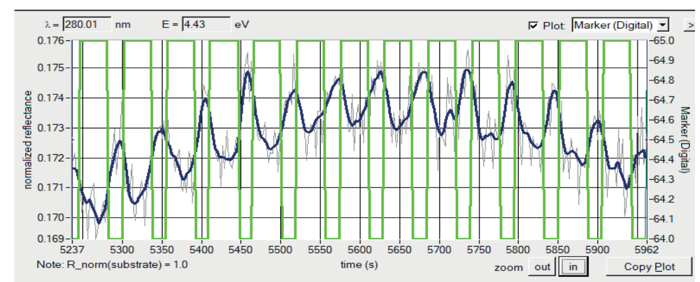

Fig. 2: Reflectance at 280 nm as monitored during AlN / GaN superlattice (SL) growth: this SL is decisive at the beginning of the UV-LED epitaxy on AlN/sapphire templates for defect reduction. Every single layer of the SL (all in the range of ~1nm) is resolved because of the excellent signal-to-noise ratio of the in-situ instrument. For Arne Knauer's talk, please click here.

DBRs for VCSELs and SESAMs: combining in-situ and ex-situ metrology

Jaime Beltran of LayTec reported on the latest progress in spectral sensing. Using DBR growth for 1040 nm SESAM (semiconductor saturable absorber mirror) as an example, he underlined that the combined use of LayTec's in-situ metrology with LayTec's ex-situ EpiX mapping stations enables completely new and comprehensive access to growth details of highly complex device stacks.

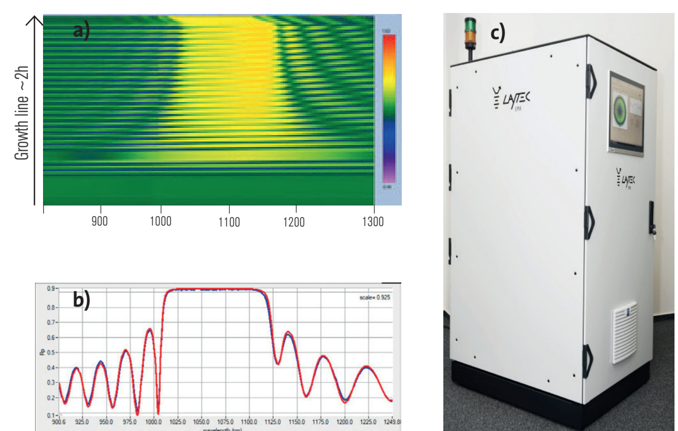

Fig. 3: DBR growth of 1040 nm SESAM devices: a) in-situ reflectance fingerprint of EpiTT VCSEL+ (with extended spectral range from 600 nm to 1600 nm) at Aixtron's G4 reactor; b) DBR's room-temperature reflectance spectrum: blue line as measured in the center of wafer after cool-down; red line is an automatic fit based on the results of in-situ analysis (~1% increase in GaAs and AlAs growth rate during the 2h of DBR process). c) EpiX VCSEL mapping station. For more details and full 2D growth rate maps, please click Jaime Beltran's slides and Thomas Zettler's Plenary Talk at EWMOVPE.

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

7–12 July 2019 | ICNS | Bellevue, Washington, USA

Dr. Kamau Prince presents joint results of LayTec and FBH Berlin: Application of UV-A and UV-B LEDs for Advanced Semiconductor Metrology for Process Control of UV-LED Epitaxy.

28 July – 2 August 2019 | ICCGE-19 / OMVPE-19 | Keystone, Colorado, USA

Dr. Kolja Haberland presents: State of the In-situ Metrology during OMVPE in Academic Research and Industrie