X-ray Diffractometer for *in-situ* and *real-time* monitoring of MOCVD

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X-ray diffraction is a well-established, non-destuctive, standardless tool for the analysis of epitaxial structures. We will present a new X-ray diffractometer that enables *in-situ* and *real-time* monitoring of metal-organic chemical vapour deposition (MOCVD). X-ray diffraction is a promising technique for *in-situ* monitoring of MOCVD growth because reflection high-energy electron diffraction, most frequently used for molecular beam epitaxy, cannot be applied in the MOCVD chambers due to high ambient pressure.

Our diffractometer uses a conventional X-ray source, it has no parts mounted inside the growth reactor and precise adjustment of the samples is not necessary. Therefore, it can be easily attached to a standard MOCVD reactor without the reactor chamber having to be significantly redesigned.

We will report on *in-situ* X-ray measurements on the nitride epitaxial structures during their growth in a standard AIXTRON single wafer MOCVD system. Using our diffractometer we were able to measure the growth rate and the composition in less than 20 seconds. In addition we could monitor the thermal expansion during heating and the strain relaxation in the epilayer as soon as the critical thickness was reached.

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