

MOCVD Production Tool for High Speed Electronic Devices

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Multiwafer metalorganic vapor phase epitaxy (MOVPE) present several advantages over other epitaxial growth technologies. These production oriented advantages are extremely uniformity of layer thickness, doping and composition, low defect density and highly efficient utilization of the precursor. These advantages result in a low cost of ownership and in a low cost for the epilayer growth process. In this contribution the status of the current industrial standard of the AIXTRON Planetary Reactor[®] currently used in production for HFET, HBT, LED, lasers and detectors is reviewed. The main features of this reactor concept is the high flexibility in reactor size (15 x 2", 35 x 2", 9 x 4", 5 x 6" wafer load) and the automated cassette-to-cassette wafer loading system.

Starting with the industrial specifications required for the epitaxial growth of electronic devices such as layer thickness uniformity of less than 1%, p and n type doping uniformity of 1% and a defect density on the wafer of less than 1 cm⁻² we show the recently obtained results from industrial applications. Production processes for HFET used in MMIC and for HBT applied in mobile communication systems will be discussed in detail. Further challenges arising from high speed optoelectronic devices such as the handling of phosphorous containing compounds will be shown to give an idea for further applications of the MOVPE process.