WERKSTOFFWISSENSCHAFTLICHES SEMINAR

Montag, 11.6.2001, 14.00 Uhr

Epitaxial Layer Growth of SiC by Cold-Wall CVD

Mike Smith
Emerging Materials Research Laboratory
Mississippi State University

Silicon carbide is an emerging technology for high power and temperature applications. The wide bandgap (3.2 eV for the 4H polytype) is useful for optical applications that require solar-blind sensors and SiC is also the primary substrate material for the GaN III-nitride system. Due to the very high degree of mechanical and chemical stability of SiC, the technology is primarily an epitaxial technology with ion implantation (carried out at temperatures normally around 700° C) used to achieve selective area doping. As such, the ability to grow high-quality epitaxial layers of specified thickness and doping density is critical to the exploitation of SiC as a device technology.

This seminar will provide an update of the SiC epitaxial growth activities in the Emerging Materials Research Laboratory. Our research has focused on a horizontal, cold-wall, atmospheric-pressure chemical vapor deposition (APCVD) has been used to grow device-quality epitaxial layers from low (~1E15 cm^{-3}) to degenerate (>1E19 cm^{-3}) doping densities. What is unique about our capability is that we can grow on 3" diameter SiC substrates and have proven a growth process with a high level of doping and thickness uniformity without wafer rotation. Recent results from our 75 mm reactor, in addition to research done on novel SiC substrates (i.e., porous SiC buffer layers), will also be discussed. Finally an implant annealing process to fully activate ion implants at 1600° C while suppressing surface degradation will be presented.

Ort: Max-Planck-Institut für Metallforschung, Stuttgart
Heisenbergstr. 5, Seminarraum

zurück