

The Silicon Carbide Epigrowth Laboratory houses the VP508 SiC CVD horizontal reactor constructed and marketed by *Epigress* of Lund, Sweden. This instrument consists of two 180-mm diameter, quartz growth cells with each cell containing a hot-wall susceptor. One cell is used for n-type doping of SiC using N₂, or for the growth of undoped SiC. The other cell is used for p-type doping of SiC using trimethyl-aluminum (TMA) as the acceptor dopant. Two cells enable very low background doping levels to be realized for either doping type. A graphite susceptor block in each cell supports the substrate and is heated by an 80 kW rf induction heating unit. Susceptors are available in dimensions large enough to accommodate 4-inch diameter SiC wafers. The normal operating temperature is 1500°C to 1600°C as measured and m/h are typical under these controlled with a pyrometer. Growth rates of ~3 conditions, with a doping and thickness uniformity of 10% and 5%, respectively. m/h are possible at higher growth. However, growth rates in excess of 100 temperatures, and the upper practical temperature limit for the proposed system exceeds 2000°C. The pressure during SiC growth can either be atmospheric or a reduced pressure. Reduced pressures are obtained using a dry pump with a throttle valve that is part of a feedback loop to control pressures between 10 and 200 mbar. A single gas handling system services both growth cells. Standard process gases include silane (SiH₄), propane (C₃H₈), and nitrogen (N₂) with hydrogen (H₂) as the carrier gas. Additional gases required to execute the research objectives listed above include hydrochloric acid (HCl), argon (Ar), an argon/silane mixture (1% SiH₄ in Ar), and one metal-organic compound: trimethyl-aluminum (TMA).

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