



Silicon Carbide Field-Effect Transistor (FET) Transducers for Harsh Environment Applications

By Walter Daves

Shaker Verlag Mrz 2013, 2013. Buch. Book Condition: Neu. Neuware - The emerging field of harsh environment semiconductor devices has a high potential to improve efficiency and safety of combustion processes significantly. Above all, robust sensor and electronic devices enable system and exhaust gas monitoring, as well as combustion control in real-time. For these applications the exposure of the devices to the harsh environment is often unavoidable. Especially for pressure and exhaust gas sensing applications, the direct contact with the harsh environment is required for sensor operation. This imposes completely different requirements on the material and the device reliability compared to silicon microsystem technology standards. In particular, resistance against temperatures as high as 600 °C and highly corrosive air/moisture environments is required. Furthermore, thermal cycling is also a major concern. Silicon carbide (SiC) is a promising semiconductor material for harsh environment sensors and electronics due to its outstanding properties and the high level of maturity of the related process technology. Despite the excellent properties of the SiC substrate material, the lifetime of SiC devices in harsh environments is above all limited by the stability of the ohmic contacts and the gate dielectrics. This work aimed at the development of novel...

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