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**Silicon Carbide Micro/Nano Systems for Demanding and Harsh Environment Applications**

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Micro/nano systems enable the development of smart products and systems by augmenting the computational ability of microelectronics with the perception and control capabilities of sensors and actuators. Micro/nano systems are also known as micro- and nanoelectromechanical systems (MEMS and NEMS), and have been commercialized in a wide range of applications including crash sensing, blood pressure measurement, optical projection, and fluid flow control to name a few. Silicon, in single- and polycrystalline forms, has been the platform semiconductor material underpinning the fabrication of the mechanical and electronic elements of micro/nano systems. However, the materials properties of silicon impose limitations on its use in harsh environment and demanding applications–for example, those involving operation in the presence of high temperatures, corrosive media, high shock loads, erosive flows, and/or high radiation, or involving performance requirements for the mechanical elements that are beyond silicon's capabilities. Silicon carbide (SiC) is an alternative platform semiconductor material that enables such applications because of its wider bandgap and higher melting/sublimation temperature, elastic modulus, fracture toughness, hardness, chemical inertness, and thermal conductivity. This talk will highlight our most recent SiC material, process, and device advances to enable sensing and actuation in applications such as propulsion instrumentation/control, power generation, resource exploration, nuclear reactor instrumentation, deep space exploration, and communications.