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Novel Ultra Wide Bandgap Power Devices and Materials

Guest Editor:

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Message from the Guest Editor

Ultra-wide bandgap (UWBG) devices are attracting increasing attention due to their potentially higher ruggedness in power electronics applications and harsh environments. Promising UWBG materials include but are not limited to gallium oxide (Ga_2O_3), diamond, aluminum nitride (AlN), and boron nitride (BN). Due to their ultra-wide bandgaps (>3.5eV), they are expected to have higher breakdown voltages and to be more immune to failure in radiative and highly temperate environments. However, due to the large bandgaps, shallow dopants are rare. Therefore, novel devices are required to fully unfurl their power. Examples of novel devices include Ga_2O_3 junctionless devices, devices with special edge termination structures such as Ar implant, NiO/Ga_2O_3 p-n diode, diamonds with surface hydrogen passivation, and $Al_yGa_{1-y}N/Al_xGa_{1-x}N$ heterostructure using 2DEG for conduction.