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Growth of P-Type 4H-SiC Single Crystals by Physical Vapor Transport Using Aluminum and

Nitrogen Co-Doping

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Abstract P-type 4H-silicon carbide (SiC) crystal growth has been achieved by physical vapor transport using aluminum and nitrogen co-doping. Aluminum carbide with a two-zone heating furnace was used for p-type doping, and yielded homogenous aluminum doping during SiC crystal growth by physical vapor transport. The 4H-SiC polytype with high-aluminum doping was unstable, but aluminum-nitrogen co-doping improved its stability. We grew p-type 4H-SiC bulk crystals of less than 90 mΩcm by using co-doping. Secondary-ion mass spectrometry and Raman spectroscopy showed that the crystal growth of highly doped p-type SiC can be achieved by using the physical vapor transport method.

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