4-inch N-type SiC Single Crystals Grown using high purity β-SiC powder

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Although there has been a lot of research on how SiC single crystal grows, the main technology is PVT technology currently being applied in the industry. The PVT process is deeply related to the growth process environment and raw material control by sublimating SiC powder and SiC monocry stallization core technologies such as defect density, crystal size, and growth rate to the seed crystal surface. In particular, it is necessary to precisely adjust the purity of the powder as impurities can be mixed in SiC powder, which is a raw material, and defects can occur during the crystalline growth process.[1-3]

This study is about 4-inch N-Type SiC single crystal growth with resistance-heated PVT (Physical Vapor Transport) method using our manufactured 6N class high purity β-SiC powder. It grew for 50 hours at a growth temperature of 2100-2200°C using high-quality 4H-SiC and C-face seeds, maintaining the growth pressure at 10-20 torr in the argon atmosphere. To implement N-type, a certain amount of nitrogen was injected inside the growth path during growth. Prior to its growth, SiC powder was conducted to verify purity by conducting an ICP-MS (Inductively Coupled Plasma Mass Spectrometry) analysis, and the secondary ion mass spectrometry (SIPS) analysis confirmed the nitrogen content contained in the powder. The growth decision was based on X-ray diffraction patterns and crystallinity.

