

Study on exclusion method of a-C layer on SiC nanowires

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Silicon carbide (SiC) nano-structures would be favorable for application in high temperature, high power, and high frequency nanoelectronic devices. In this study, we have deposited cubic-SiC nanowires on Au-deposited Si (001) substrates using 1,3-disilabutane as a single molecular precursor through a metal-organic chemical vapor deposition (MOCVD) method. The general deposition pressure and temperature were 3.0×10^{-6} Torr and 1000 °C respectively, with the deposition carried out for 1 h. Au played an important role as a catalyst in growing the SiC nanowires. SiC nanowires were grown using a gold catalyst, with amorphous carbon surrounding the final SiC nanowire. Thus, the first step involved removal of the remaining SiO₂, followed by slicing of the amorphous carbon into thin layers using a heating method. Finally, the thinly sliced amorphous carbon is perfectly removed using an Ar sputtering method. As a result, this method may provide more field emission properties for the SiC nanowires that are normally inhibited by the amorphous carbon layer. Therefore, exclusion of the amorphous carbon layer is expected to improve the overall emission properties of SiC nanowires.