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Material Characterization of a Doped Triangular Silicon Nanowire Using Raman Spectroscopy

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Abstract

A top-down silicon nanowire fabrication using a combination of optical lithography and orientation dependent etching (ODE) has been developed using a doped Silicon-on Insulator (SOI) as the starting substrate. The use of ODE etchant such as potassium hydroxide (KOH) and Tetra-Methyl Ammonium Hydroxide (TMAH) is known to create geometrical structures due to its anisotropic mechanism of etching. The SOI is doped with an n-type dopant (phosphorus) and the doped silicon nanowire is then characterized using Raman Spectroscopy. Due to the changes in the silicon structure, the result shows that the highly doped silicon nanowire has a wider Full Width Half Maximum (FWHM) as compared to the undoped silicon substrate.

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