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## Electrical characterisation of highly doped triangular silicon nanowires

(Conference Paper)

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## Abstract

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A top-down silicon nanowire fabrication using a combination of optical lithography and orientation dependent etching (ODE) has been developed using <100> Silicon-on Insulator (SOI) as the starting substrate. Initially, the samples were doped with phosphorus using the diffusion process resulting in carrier concentration of  $2 \times 10^{18} \text{ cm}^{-3}$ . After the silicon nanowires were fabricated, they were measured using a dual configuration method which is similar to the four-point probe measurement technique to deduce its resistivity. The data obtained had suggested that the doping distribution in the silicon nanowires were lower and this may have been affected by the surface depletion effect. In addition, with respect to carrier mobility, the effective mobility of electrons extracted using the four-point probe data had demonstrated that the mobility of carriers in the silicon nanowire is comparable with the bulk mobility. This is most probably due to the fact that in this research, the quantum confinement effect on these nanowires is not significant. © (2014) Trans Tech Publications, Switzerland.

## Author keywords

Dual configuration   Mobility   Silicon nanowire   Spin-coating

## Indexed keywords

Engineering controlled terms: Carrier concentration   Carrier mobility   Manufacture   Photolithography   Probes   Silicon  
Silicon on insulator technology   Spin coating

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