

Electronic supporting information (ESI)

Large-Scale Parallel Arrays of Silicon Nanowires via Block Copolymer Directed Self-Assembly

Richard A. Farrell,^{ab} Niall T. Kinahan,^{ac} Stefan Hansel,^{ac} Karl O. Stuen,^d Nikolay Petkov,^b Matthew T. Shaw,^{ac} Laetitia E. West,^{ac} Vladimir Djara,^b Robert J. Dunne,^e Olga G. Varona,^e Peter G. Gleeson,^{ac} Soon-Jung Jung,^{af} Hye-Young Kim,^{ac} Maria M. Kolesnik,^{ac} Tarek Lutz,^{ac} Christopher P. Murray,^{ac} Justin D. Holmes,^{ab} Paul F. Nealey,^e Georg S. Duesberg,^{ad} Vojislav K. Krstić,^{ac} Michael A. Morris,^{*ab}

^a Centre for Research on Adaptive Nanostructures and Nanodevices (CRANN), Trinity College Dublin, Dublin 2, Ireland. Fax: 353 214 274097; Tel: 353 214 902 180; E-mail: m.morris@ucc.ie

^b Materials Chemistry & Analysis Group, Department of Chemistry and the Tyndall National Institute, University College Cork, Cork, Ireland.

^c School of Physics, Trinity College Dublin, Dublin, Ireland.

^d Department of Chemical & Biological Engineering and Centre for Nanotechnology, University of Wisconsin, Madison, WI 53706, USA

^e Intel Ireland Ltd., Collinstown Industrial Estate, Co. Kildare, Ireland.

^f School of Chemistry, Trinity College Dublin, Dublin 2, Ireland.

1. Line Edge Roughness (LER) calculations

NIH public domain ImageJ software was used to process images to determine the line edge roughness of the aligned patterns. Images were first calibrated to calculate the pixel to nm ratio. The images were then converted to a binary map. Line edge analysis was performed to convert the pattern to a series of distinct lines. Various sections were taken from the profile and converted to an x-y plot. The 3-sigma value of the standard deviation was then calculated. Although this is a crude method for absolute LER

determination, it can be used to evaluate LER changes during processing steps. This is a crude method for calculating absolute LER but it serves as method for establishing LER changes during pattern transfer and contact deposition.

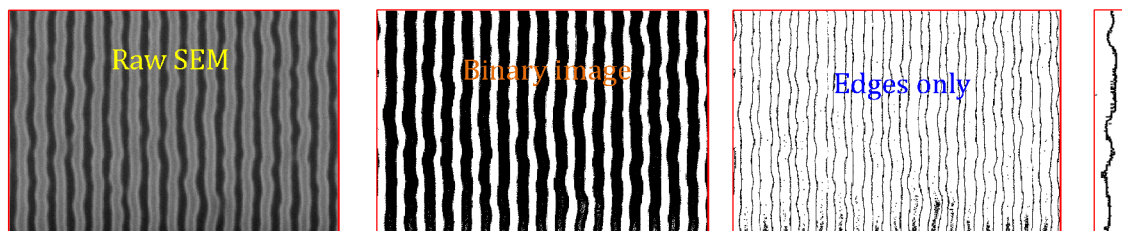


Figure S1: (a) as-captured SEM tiff image (b) transformed binary image (c) edge only image and (d) single line profile.

2. Additional considerations for the specific contact resistance

We would like to further compare and put into perspective the specific contact resistance value we have obtained as we probe ranges of values that are not typical. For the material combination used, low p-doped/intrinsic Si with Ti/Au, several theoretical papers predict ρ_c in the order of 100 Ω cm.[insert citations Vojislav ref paper, Sze etc. here]

It was shown for lateral structures, that ρ_c scales with ρ [1-4]. The resistivity-independent value ρ_c/ρ allows a comparison of the lightly doped / intrinsic silicon used here with literature values. We find $\rho_c/\rho = (9 \pm 3) \mu\text{m}$ which is at the bottom end of previously reported values of (6 – 45) μm for individually contacted, moderately doped Si-NWs[1] indicating similar contact quality. This value is about one order of magnitude larger than the values of (0.1 – 2) μm previously obtained for highly doped films with flat ohmic contacts [3, 5].

Ultimately, the geometry independent values for ρ and ρ_c as well as ρ_c/ρ and the field effect obtained in this study are all positively comparable to other reports in literature for Si-NWs with comparable dimensions[6-8].

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