

Rolling Nanoelectrode Lithography (RNEL) Based on the Manipulation of Silicon Surface with Ethyl Alcohol

Rashed Md. Murad Hasan^{1,2}, Zhengjian Wang¹ and Xichun Luo^{1,#}

¹ Centre for Precision Manufacturing, DMEM, University of Strathclyde, Glasgow G1 1XJ, UK

² Department of EEE, Chittagong University of Engineering and Technology, Chittagong-4349, Bangladesh

Corresponding Author / Email: xichun.luo@strath.ac.uk

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We demonstrated that surface manipulation of silicon substrate with ethyl alcohol can increase the oxide growth rate during the rolling nanoelectrode lithography (RNEL) process. Here, we performed the oxidation process with the modified silicon substrate which shows an enhanced oxidation growth rate by almost an order of magnitude that of an unmodified silicon substrate. The parametric effects on oxide growth were performed, where the rolling speed and the applied bias voltage were identified as the primary control parameters for oxide growth. Experimental studies show the linear dependence of the oxide height as a function of the applied voltage, whereas the oxide height is increased with decreasing the rolling speed. The present results show that rolling nanoelectrode lithography can be a suitable large-area fabrication approach to fabricate nanostructures with high aspect ratios.
