

Enhancing Oxide Growth Rate in Rolling Nanoelectrode Lithography (RNEL) Process

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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.
