

## Invited Paper

### Scalable and Direct Growth of Graphene Microribbons and Nanoribbons on Dielectric Substrates

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**Abstract:** Graphene has great potential applications in electronic and optical areas. However, its zero band gap lead to the disadvantages of low on/off ratio in field effect transistors and low optical wavelength selectivity in photo detectors. Moreover, the contamination in CVD graphene transfer process limits the graphene quality. In this work, we propose a novel transfer-free and contaminant-free direct growth processes to scalable growth of graphene microribbons and nanoribbons on dielectric substrates. For graphene microribbons (5  $\mu\text{m}$ ) and nanoribbons (20 nm), they show high on/off ratio and high mobility at room temperature, all those results have shown significant improvement over the conventional lithography method. This method overcomes many practical limitations of the previously demonstrated methods for the patterning of graphene microribbons and nanoribbons and is compatible with large-scale fabrication of graphene nano devices.

**Keywords:** Graphene; Direct Growth; Microribbons; Nanoribbons; Electronic Properties