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# Performance of Screen-Printed Large Lateral Size Single-Layer Graphene Emitter with Buffer Layer

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## Abstract

This report demonstrates an effective and large scale producible method to make high performance field emitters using large size graphene oxide (GO) sheets obtain by frozen assisted gradient centrifugation. Most of large size GO sheets had their lateral size about 50  $\mu\text{m}$  and high quality graphene structure with high 2D peak in Raman spectra after reduction. Screen printing method was introduced to plant the reduced GO sheet (rGS) in buffer layer on silicon substrates. Results indicated the emitters with large size rGS had better performance field emission properties than small size rGS with lower turn-on field reduced from 4V/ $\mu\text{m}$  to 0.4V/ $\mu\text{m}$  and higher field emission current increased by more than ten times. This study confirmed the electronic properties of rGS electrodes strongly depend on the lateral size of their precursor GO sheets. And the industrial printing approach will be essential for practical applications of rGS based electronic devices.

**Keywords:** carbon materials, nanocomposites, electronic materials, graphene, screen printing, field emission.

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