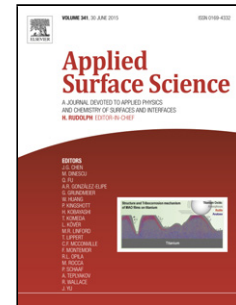


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## Structure and field emission of graphene layers on top of silicon nanowire arrays

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### ABSTRACT

Monolayer graphene was grown on copper foils and then transferred on **planar silicon substrates and on** top of silicon nanowire (SiNW) arrays to form single- to quadruple-layer graphene films. The morphology, structure, and electron field emission (FE) of these graphene films were investigated. **The graphene films on the planar silicon substrates were continuous.** The single- to triple-layer graphene films on the SiNW arrays were discontinuous and while the quadruple-layer graphene film featured a mostly continuous area. The Raman spectra of the graphene films **on the SiNW arrays** showed  $G$  and  $G'$  bands with a singular-Lorentzian shape together with a weak  $D$  band. The  $D$  band intensity decreased as the number of graphene layers increased. The FE efficiency of the graphene films on **the planar silicon substrates and** the SiNW arrays varied with

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