

# Growths of Highly Ordered Mesoporous Graphene-Oxide Thin Films

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Mesoporous graphene-oxide thin films (MGTFs) with highly ordered hexagonal vertical channels been grown on silicon substrates. The hexagonal morphology was hard templated by vertical mesochannels via catalyst-free CVD process and directly evidenced in Raman and XPS techniques. Additionally, the graphene-oxides were further characterized by Raman G/D ratios on Mesoporous Zeolite Nanoparticles (MZNs) and Mesoporous Zeolite thin films (MZTFs) with enhanced optical and electrical properties compared to bare silicon substrates. Without using catalysts, carbon precursors were directly pyrolyzed, deposited and overgrown onto zeolite based materials, resulting mesoporous hybrid thin films with uniform surface and film thickness of 10-15 nm. Vertically grown graphene-oxide have extended surface area and ordered mesoporosity can be utilized to quench fluorescence of low-concentration ( $10^{-7}$  M) dyes and collect graphene enhanced resonance spectroscopy (GERS) without using plasmonic nanoparticles.

References: (Single space, 10 points, AIP style, left-justified in numbered order)

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