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How strain affect graphene's optical contrast on SiO₂/Si gratings
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contrast interference provides a fast and easy method for identifying graphene layer
number the widely used silicon dioxide/silicon substrates. Uniaxial strain deforms
the band structure and consequently it has been suggested that optical absorption
in visible range varies with strain.¹ Here we explore how uniaxial strain affects the
optical contrast. Mechanically cleaved single layer graphene is deposited onto si-
nusoidal shaped SiO₂ optical diffraction grating. Graphene strains as it conforms
to the corrugated surface. We observe a dramatic optical contrast change for the
graphene on the grating under white light and different color channels. To quan-
titatively analyze this optical response, we map graphene's strain distribution by
analyzing redshift of G and 2D peaks positions in Raman line scan measurement
and compare with AFM measurements to compare optical and Raman results
with how well graphene conforms to the corrugated surface. We explore different
surface treatments that vary the friction between the graphene and the corrugated
oxide in order to control the strain and the conformation.

¹Many-Electron Effects on Optical Absorption Spectra of Strained Graphene, Liang
et al, arXiv:1110.0212 [cond-mat.mtrl-sci]

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