

# Characteristics of monolayer-graphene-based perfect absorption structures

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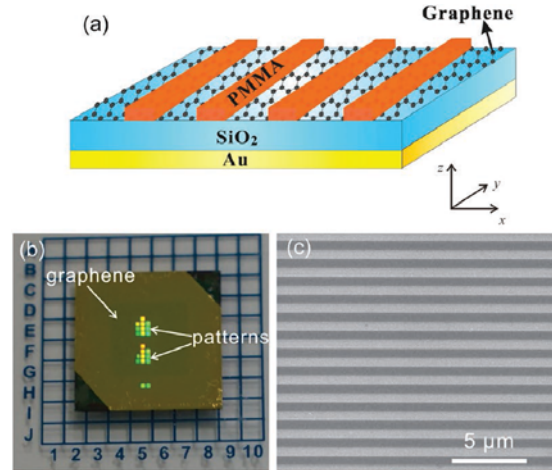
Graphene has been studied intensively due to its outstanding optical and electronic properties. However, the absorption efficiency of suspended monolayer graphene is only 2.3%, which limits its optoelectronic applications. Until now, many methods have been investigated to improve the absorption of graphene<sup>[1-3]</sup>. Here we demonstrate perfect absorptions in experiment for monolayer graphene based subwavelength structures in the near infrared. Measured peak absorptions over 99% with bandwidths about 20 nanometers for TE polarization were obtained from monolayer graphene coupled with subwavelength gratings and a back gold mirror. The detailed characteristics of the perfect absorption structures will be discussed.

Figure 1 shows the monolayer graphene based absorption structure under investigation in this work. Figure 2 shows the measured and simulated reflection (R) and absorption (A) spectra of the fabricated absorption structures.

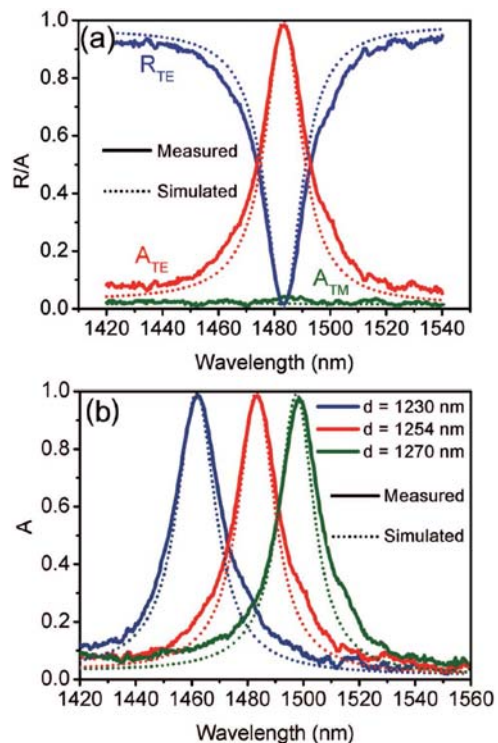
## References

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## Figures



**Figure 1:** a) Schematic image of the monolayer graphene based absorption structure. b) Optical image of the fabricated sample. c) Top SEM image of a fabricated pattern.



**Figure 2:** a) Reflection and absorption spectra of a fabricated absorption structure with  $d = 1254$  nm. b) Absorption spectra of fabricated structures with different grating periods.