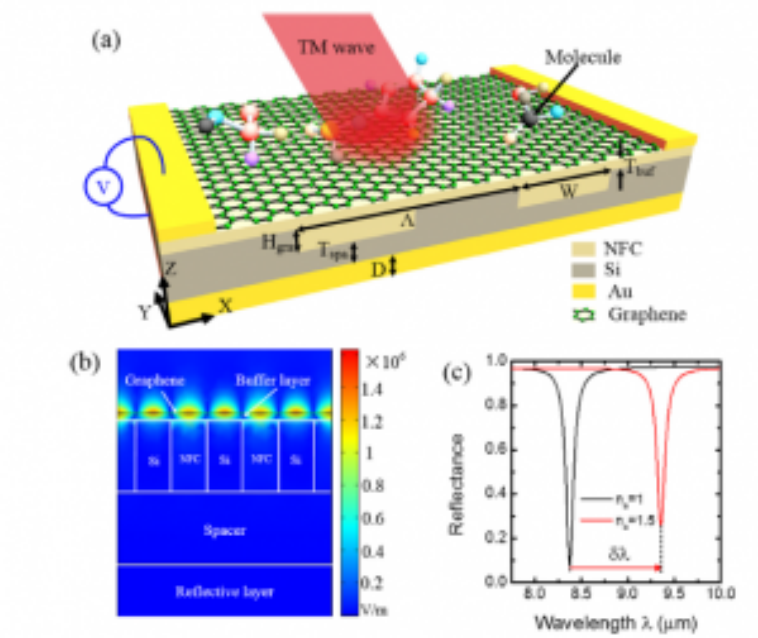
Cavity-enhanced continuous graphene plasmonic resonator for infrared sensing



They propose a cavity-enhanced resonator based on graphene surface plasmonics for infrared sensing. In such a resonator, a continuous and non-patterned monolayer graphene serves as the sensing medium by exciting surface plasmons on its surface, which can preserve the excellent electronic property of graphene and avoid the interaction between biomolecules and dielectric substrate. To improve its sensing performance, an optical cavity is employed to enhance the coupling of the incident light with the resonator. Simulation results demonstrate that the reflection spectra of the resonator can be modified to be narrower and deeper to improve the figure of merit (FOM) of the device significantly by adjusting the structure parameters of the cavity and the Fermi energy level.

The FOM can achieve a high value of up to 20.15 RIU^{-1}, which is about twice larger than that of the traditional structure without a cavity. Furthermore, the resonator can work in a wide angle range of the incident light. Such a plasmonic

resonator with excellent features may provide a strategy to engineer graphene-based SPR sensor with high detection accuracy.

Source:http://www.sciencedirect.com/science/article/pii/S0030401816305028

Related paper: Wei Wei et al.,Cavity-enhanced continuous graphene plasmonic resonator for infrared sensing, Optics Communications ,Volume 395, Pages 147–153,(2017).