明志科技大學
MING CHI UNIVERSITY OF TECHNOLOGY

四技部工讀實務實習

104 年成果發表展示會

題目：Functionalized SERS Substrate by Nanohybrids of Silver Nanoparticles for Rapid Detection of Pollutants

工作項目

- **Functionalized SERS Substrate by Nanohybrids of Silver Nanoparticles for Rapid Detection of Pollutants**
- **Synthesis of Exfoliation of Graphene Oxide**
- **Synthesis of Silver nanoparticle**
- **Synthesis of PDDA - Functionalized GrapheneOxide.**
- **Fabrication of Graphene Oxide/Ag Nanoparticle Hybrids.**

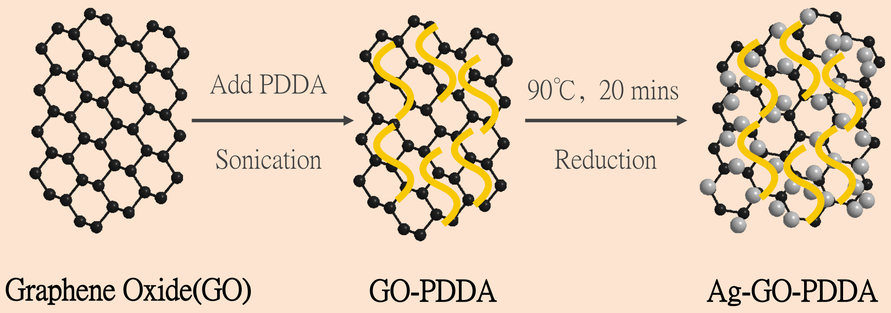
內容摘要

ABSTRACT

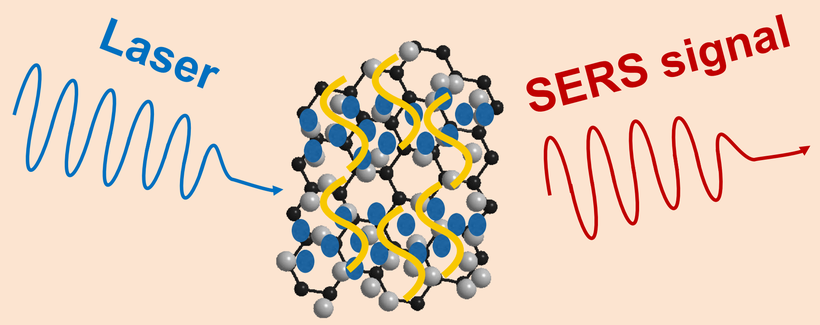
We have successfully fabricated a surface enhanced Raman scattering (SERS) substrate by the nanohybrid of silver nanoparticles and graphene oxides (Ag/GO) nanosheets. Graphene oxides were prepared using modified Hummer methods and then embedded the silver nanoparticles on the polydiallyldimethylammonium chloride (PDDA) modified GO nanosheets. We would use the obtained Ag/GO nanosheets to detect of dye pollutants. Ag/GO nanosheets exhibited strong enrichment of dye pollutants due to the electrostatic interaction,and the self-assembled Ag nanoparticles greatly enhanced the SERS spectra of dye pollutants, both of which led to an ultrahigh sensitivity. The novel Ag/GO nanosheet provides ultrasensitive SERS detection and rapid separation capability, which offers great potential for practical applications in environment pollution and biomedical fields.

實習成果

Ag-GO Produce Schematic diagram



Ag-GO SERS substrate action diagram



Result & Discussion

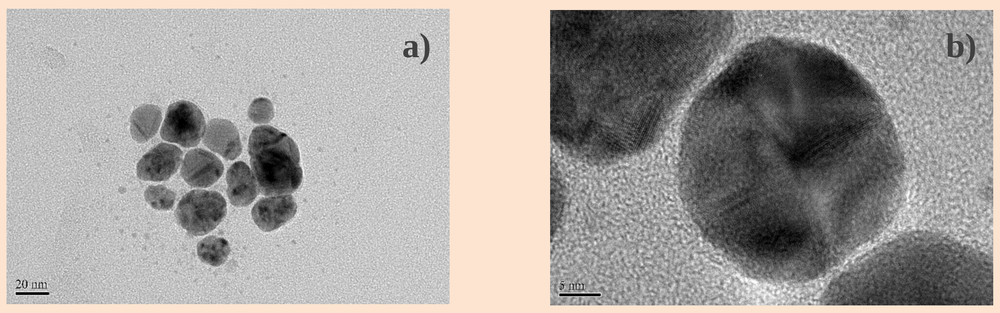


Figure 1. TEM image of different magnifications AgNPs (a) x100k (scale bar: 20 nm). (b) x500k (scale bar: 5 nm).

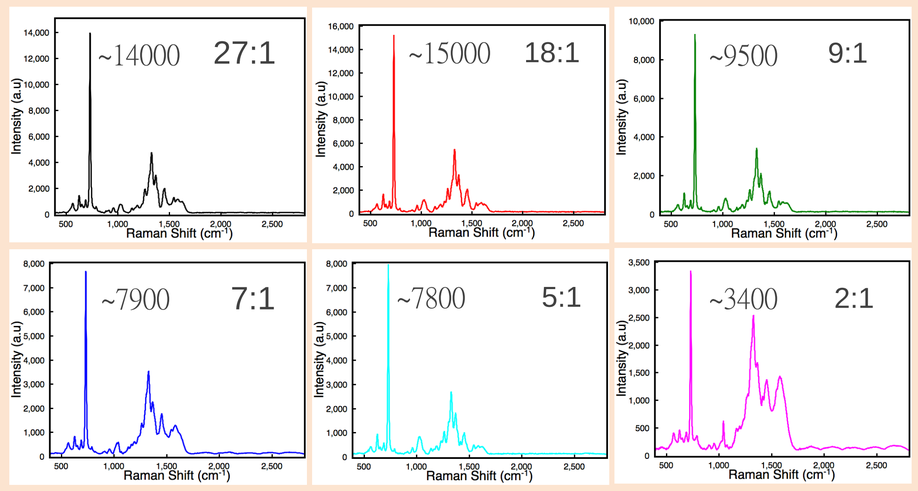


Figure 2. Detecting 10^{-4} M Adenine by different concentration of Ag-GO

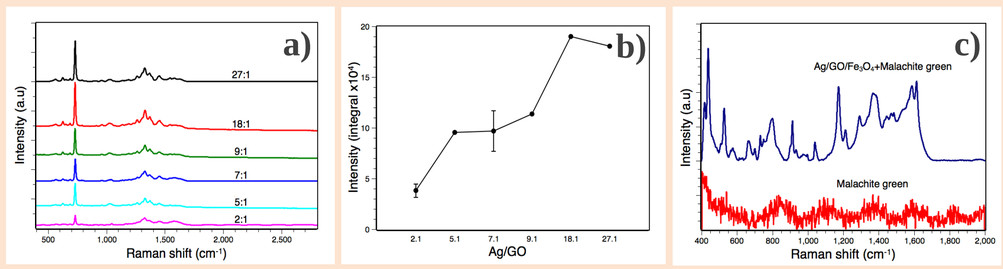


Figure 3. SERS spectra (a) of 10^{-4} M Adenine on different proportion AgNPs/GO substrate (b) for intensity integral of different proportion AgNPs /GO substrate with 10^{-4} M Adenine (c) of 50ppm Malachite green on AgNPs/GO(18:1) and 50 ppm Malachite green Raman spectra.

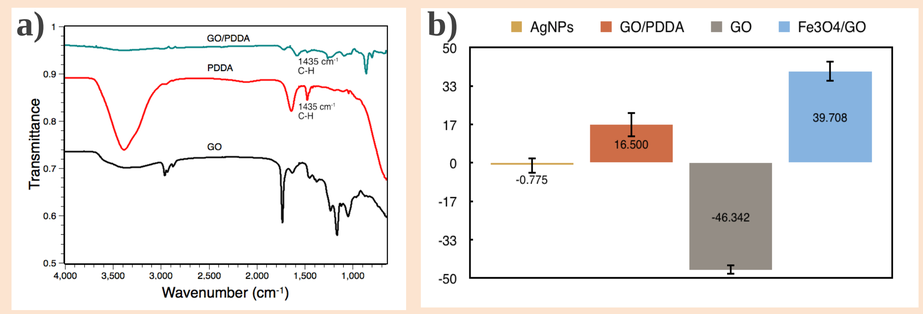


Figure 4. FTIR image of (a) GO/PDDA, PDDA, GO. (b) ZETA potential of AgNPs, GO/ PDDA, GO, Fe_3O_4/GO.

材料系

實習單位: Institute of Atomic and Molecular Sciences,Academia Sinica

實習廠區: NB02　實習期間: 103/9/17~104/9/16

姓名: 王冠勛　學號: U01187102　輔導老師: 劉定宇　指導主管: 王玉麟