

## **Fabrication of Modified Chitosan-Gold Nanoshell with Mercaptopropionic Acid(MPA) for $\gamma$ -Aminobutyric Acid Detection as a Surface-Enhanced Raman Scattering Substrate**

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**Abstract :** Surface-enhanced Raman Scattering (SERS) as the principle for enhancing Raman scattering by molecules adsorbed on rough metal surfaces or by nanostructures is used to detect the concentration change of  $\gamma$ -Aminobutyric Acid (GABA). GABA is the mainly inhibitory neurotransmitter in the mammalian central nervous system in the human body. It plays such significant role in reducing neuronal excitability throughout the nervous system. In this case, the Mercaptopropionic Acid (MPA) is used to modified chitosan -gold nanoshell, which enhances the absorption between GABA and Chitosan-gold nanoshell. The sulfur end of the MPA is linked to gold which is the surface of the chitosan nanoparticles via the very strong S-Au bond, while a functional group (carboxyl group) attached to GABA. The controlling of particles' size and the surface morphology are also the important factors during the whole experiment. The particle around 100nm is using to link to MPA, and the range of GABA from 1mM to 30mM was detected by the Raman Scattering to obtain the calibrate curve. In this study, DLS, SEM, FT-IR, UV, SERS were used to analyze the products to obtain the conclusion.

**Keywords :** chitosan-gold nanoshell, mercaptopropionic acid,  $\gamma$ -aminobutyric acid, surface-enhanced raman scattering

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