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Surface Enhanced Raman Substrate Detection on the Structure of γ-Aminobutyric Acid(GABA) Connected with Modified Gold-Chitosan Nanoparticles by Mercaptopropionic Acid (MPA)

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Abstract : A 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 γ-Aminobutyric Acid (GABA). As for the gold-chitosan nanoshell, it is made by using chitosan nanoparticles crosslinking with sodium tripolyphosphate(TPP) for the first step to form the chitosan nanoparticles, which would be covered with the gold sequentially. The size of the fabricated product was around 100nm. Based on the method that the sulfur end of the MPA linked to gold can form the very strong S–Au bond, and the carboxyl group, the other end of the MPA, can easily absorb the 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. When the system formed, it generated SERS, which made a clear difference in the intensity of Raman scattering within the range of GABA concentration. So it is obtained from the experiment that the calibration curve according to the GABA concentration relevant with the SERS scattering. 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, γ-aminobutyric acid, surface-enhanced Raman scattering
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