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Mercaptopropionic Acid (MPA) Modifying Chitosan-Gold Nano Composite for γ-Aminobutyric Acid Analysis Using Raman Scattering

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Abstract : The goal of this experiment is to develop a sensor that can quickly check the concentration by using the nanoparticles made by chitosan and gold. Using chitosan nanoparticles crosslinking with sodium tripolyphosphate(TPP) is 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. As for the GABA, what is the primary inhibitory neurotransmitter in the mammalian central nervous system in the human body. It plays such significant role in reducing neuronal excitability pass through the nervous system. 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). When the system is 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 : mercaptopropionic acid, chitosan-gold nanoshell, γ-aminobutyric acid, surface-enhanced raman scattering
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