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Development of MB-GNR@SiO_2 integrated graphene oxide nanocomposites for enhancement of SERS performance and photo thermal effect

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Plasmonic gold nanoparticles have been one of the most promising materials for nanomedicine due to their biocompatibility and well defined optical properties. Especially, anisotropically grown gold nanorods (GNRs) have drawn more attention for biomedical applications than other gold nanostructures because of a strong longitudinal surface plasmon resonance (LSPR) under near infrared (NIR) light with long penetration depth in biological tissue. In the previously, methylene blue embedded GNR-silica (MB-GNR@SiO_2) core-shell nanocomposites have the NIR light induced surface enhanced raman scattering (SERS) performance with a Raman enhancement factor of 3.0x1010 and a synergistic effect of photodynamic/photo thermal therapies of cancer cells. In addition, we proposed a facile strategy for increasing the photo thermal conversion efficiency of GNRs by integration to form graphene oxide (GO) nanocomposites. In this study, we successfully synthesized the MB-GNR@SiO_2 integrated GO nanocomposites (MB-GNR@SiO_2/GO) that could lead to enhance remarkably not only the photo thermal effect but also the SERS signal compared to that of MB-GNR@SiO_2.

Biography

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