

Layer-by-layer assembled photocatalysts films of TiO_2 nanoparticles (TiO_2NP) combined with either sulfonated polystyrene (PSS) or graphene oxide (GO) are employed for the photodeposition of Ag nanoparticles and subsequently used in surface-enhanced Raman scattering. Both photocatalysts films, $\text{TiO}_2\text{NP}/\text{PSS}$ and $\text{TiO}_2\text{NP}/\text{GO}$, are capable of driving the formation of AgNP when kept immersed into AgNO_3 diluted solution under UV irradiation (254 nm). The rate constants of AgNP formation, determined by UV-vis spectroscopy, are basically the same at both films. Nonetheless, scanning electron microscopy reveals that at the $\text{TiO}_2\text{NP}/\text{PSS}$ film, the photodeposited AgNP are larger and isolated, while at the $\text{TiO}_2\text{NP}/\text{GO}$ film, they are smaller and highly inter-connected. The Raman spectrum of rhodamine B (model probe) is enhanced at both films; however, the enhancement is much higher at the $\text{TiO}_2\text{NP}/\text{GO}$ film, because GO is a suitable anchoring harbor for interconnected AgNP and also quenches the fluorescence emission of rhodamine B, something that PSS is unable to do. The enhancement is even more pronounced when samples are excited at 633 nm, because of the resonant condition with rhodamine B absorption.