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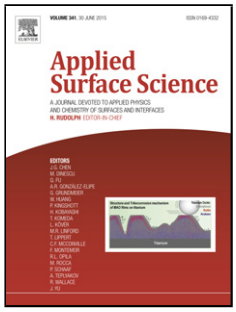

Title: Contribution of oligomer/carbon dots hybrid semiconductor nanoribbon to surface-enhanced Raman scattering property

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Research Highlights

>The hybrid Ag-(PS-PSS)/C-dots nanobelts (NBs) have been prepared > Ag-(PS-PSS)/C-dots NB has been demonstrated to be an excellent substrate for surface-enhanced Raman scattering (SERS) with a detection limit of 10^{-14} M > The organic (PS-PSS)/C-dots not only acts as a dielectric support for Ag NPs to reduce the surface plasmon damping at the Ag-NR interface due to the high electrical conductivity but also their large surface area are favorable for creating more "hot-spots".

Contribution of oligomer/carbon dots hybrid semiconductor nanoribbon to surface-enhanced Raman scattering property

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Abstract

The hybrid Ag-(PS-PSS)/C-dots nanobelts (NBs) have been prepared by decorating Ag nanoparticles (NPs) on surface of the ultra-long, semiconducting (PS-PSS)/C-dots nanoribbons (NRs) via an electroless plating method. The as-prepared Ag-(PS-PSS)/C-dots NB has been demonstrated to be an excellent substrate for surface-enhanced Raman scattering (SERS) with a detection limit of 10^{-14} M and an enhancement factor of 3.35×10^{8} while using rhodamine 6G as probe molecules. Moreover, we have investigated the application of Ag-(PS-PSS)/C-dots NBs as SERS substrate for detection of coumarins. Further, the Ag-(PS-PSS)/C-dots NB could be used as a sacrificial template to form a novel kind of hollow porous Ag nanotubes (NTs) by simply removing the inner NR in tetrahydrofuran. However, the obtained Ag NTs show a weaker SERS effect compared to that of the Ag-(PS-PSS)/C-dots NBs, which indicates that the inner organic /C-dots NR plays an essential role in SERS property of the Ag-(PS-PSS)/C-dots NBs. Here the organic (PS-PSS)/C-dots NR not only acts as a dielectric support for Ag NPs to reduce the surface plasmon damping at the Ag-NR interface due to the high electrical conductivity but also their large surface area are favorable for creating more "hot-spots". In addition, the embedded sp^2-hybridized C-dots in NR can adsorb more aromatic R6G molecules via π–π interaction,

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