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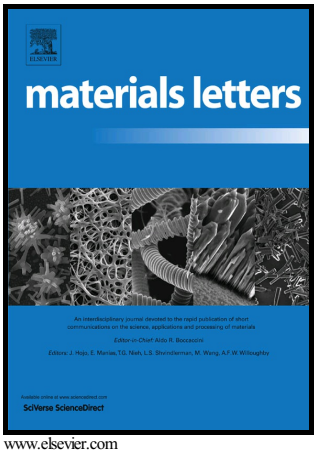

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Ultrasensitive Detection of a 1-Pyrenecarboxylic Acid by surface enhanced Raman scattering Hot Spot with reduced graphene oxide/silver nanoparticles composites

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Abstract: This manuscript demonstrated a simple and efficient method to detect 1-pyrenecarboxylic acid dissolved in water solution at nanoscale level via surface enhanced Raman Scattering Hot Spot with reduced graphene oxide/silver nanoparticles (Ag-NPs) nanocomposites (RGO/Ag-NPs). Ag-NPs were attached *in situ* onto RGO surface with different concentrations of $AgNO_3$ in the presence of aqueous solution of 1-pyrenecarboxylic acid. The morphology and structures of the as-prepared samples were characterised with FT-IR, UV-VIS absorption, DLS, Zeta potentials, Raman spectroscopy, TEM and XRD. At higher $AgNO_3$ concentration, Ag-NPs get aggregated onto the surface of RGO and created surface enhanced Raman spectroscopy (SERS) Hot spot which detect 1-pyrenecarboxylic acid due to the greatly enhanced electromagnetic field. This novel concept can be extended for sensing different water pollutants including polycyclic aromatic hydrocarbons and benzene derivatives.

Keywords: Graphene oxide, SERS, Hot Spot, 1-Pyrenecarboxylic acid

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