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Ultrafast self-assembly of silver nanostructures on carbon-coated copper grids for surface-enhanced Raman scattering detection of trace melamine

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Abstract

Structurally well-defined assemblies of silver nanoparticles, including the dendritic nano-flowers (NFs), planar nano-spheres (NSs) and nano-dendrites (NDs) were obtained by a surfactant-free and ultrafast (≈ 15 min) self-assembly process on as-purchased carbon-coated copper TEM grids. The silver nano-assemblies, especially the NFs modified TEM grids, when serving as surface-enhanced Raman spectroscopy (SERS) substrates for detecting melamine molecules, demonstrated a long-lived limit of detection (LOD) of as low as 10^{-11} M, suggesting the potential of these silver-assemblies modified carbon-coated copper grids as novel portable and cost-effective SERS substrates for trace detection toward various food contaminants like melamine.

Keywords: SERS detection; self-assembly; noble metals; melamine; food contamination

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