Supporting Information

Hierarchical Heterostructure of Ag-Nanoparticle Decorated Fullerene Nanorods (Ag-FNRs) as an Effective Single Particle Freestanding SERS Substrate

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1. Additional SEM images and histograms of length and diameter distributions of FNRs

**Fig. S1** (a – d) SEM images of ultrarapidly grown FNRs, (e) histogram of length distribution of randomly selected 100 FNRs with mean length of ~11 μm, and (f) corresponding diameter distribution with mean diameter of ~215 nm.
2. Additional TEM images of FNRs

Fig S2 (a – c) TEM images of ultrarapidly grown FNRs, and (d) HR-TEM image of FNR from the thin edge region. SAED pattern (inset of panel b) indicates the highly crystalline nature of FNRs.
3. Additional SEM images of Ag-FNRs

![Additional SEM images of Ag-FNRs](image)

*Fig. S3* Additional SEM images of Ag-FNRs.

4. Histogram of size distribution of Ag-NP in Ag-FNRs heterostructure

![Histogram of size distribution of Ag-NP](image)

*Fig. S4* Histogram of size distribution of Ag-NP in Ag-FNRs with mean diameter of ~12 nm.

5. Additional TEM images of Ag-FNRs
Fig. S5 Additional TEM images of Ag-FNRs. Inset of top right image shows SAED pattern.
6. Additional HR-TEM images of Ag-FNRs

Fig. S6 (a, b) Dark field TEM images of Ag-FNRs as typical examples and (c – f) additional HR-TEM images of Ag-FNRs. Inset of panel c shows SAED pattern of the Ag-FNR. Yellow circles reflect the diffraction of Ag-NP and green circles represent electron diffraction from crystalline fullerene C$_{60}$. 
7. Additional XPS data

**Fig. S7** XPS O 1s spectra with deconvoluted peaks for pC₆₀, FNR and Ag-FNR.

8. Optical micrographs of Ag-FNR before and after Raman laser irradiations

**Fig. S8** Optical microscopic images of Ag–FNR on Si-substrate before (a,b) and after (c,d) Raman Laser irradiation during SERS measurements.
9. Additional SERS data: Dependence of SERS peak against R6G concentration

![Figure S9](image)

**Fig. S9** Dependence of SERS peak intensity at 613 and 1183 cm$^{-1}$ against R6G concentration.

10. SERS data on Ag-NP thin film on planar substrate

![Figure S10](image)

**Fig. S10** Comparison of SERS data acquired on Ag-NP thin film on a planar substrate and Ag-FNR free standing substrate. R6G concentration is fixed to 1 μM.