A Microfluidic Approach for the Formation of Conductive Nanowires and Hollow Hybrid Structures

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S1-S11 Further characterization of the structures

Figure S1. Scanning electron microscopy (SEM) images of the resulting materials formed at flow-rate ratio of 1 and at concentration of: a) 0.0024M (TTF), 0.0006M (hydrogen tetrachloroaurate) and b) 0.0072M (TTF), 0.0018M (hydrogen tetrachloroaurate).

Figure S2. Graph showing the correlation between average widths of the structures with their standard deviation and the flow-rate ratio of the synthesis. The averages are calculated from approximately 100 different wires chosen randomly and from different areas for each sample.
Figure S3. SEM images of hybrid wires prepared at a flow-rate ratio of: (a) 0.5, (b) 1 and (c) 2.

Figure S4. Bidimensional X-ray images of samples prepared at flow-rate ratio of: a) 0.1, b) 1, c) 10 and d) 14. In green the reflexion peaks related to the π-stacking distance between TTF molecules.
Figure S5. XRD patterns for the three intermediate hybrid frameworks prepared at flow-rate ratios of 0.5, 1, and 2. All the samples have the same reflexion peak at 22.5° (3.9 Å), which is related to the π-stacking distance between TTF molecules.

Figure S6. Energy-dispersive X-ray (EDX) spectrum of a nanowire produced at a flow-rate ratio of 14. The measurement is made after deposition on a glass slide. The spectra clearly show the peaks corresponding to S, Cl and Au.
Figure S7. XRD pattern of a sample prepared at a flow-rate ratio of 1 showing characteristic peaks (111), (200) and (220) of metallic face-centered-cubic (fcc) gold together with the peak at 22.5º attributed to the face-to-face distance between the π-stacking TTF planes.

Figure S8. a) and b) SEM image showing nanowires prepared at flow-rate ratio of 14 functionalized with nanoparticles. c) A fluorescent microscopy image
Figure S9. a) UV-vis spectra of the different samples measured just after their preparation on the microchip. The spectra show a clear charge transfer band at $\lambda > 800$ nm and the formation of the TTF cation radical with the band located at 579 nm [19]. b) ESR spectrum of nanowires produced at a flow-rate ratio of 14 measured at 77 K.
Figure S10. Graph showing $I/V$ curves for different devices. The samples measured were prepared at flow-rate ratio of 10.

Figure S11. Individual $I/V$ sweep characteristic of a sample prepared at flow-rate ratio of 10.