Supporting Information

Near-Infrared Chiral Plasmonic Microwires Through Precision Assembly of Gold Nanorods On Soft Biotemplates

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Supporting Figures



Figure S1. Confirmation of MUTAB functionalization of AuNR. XPS of AuNR⁺ in the S 2p region shows two peaks at 161.5 eV and 162.7 eV, assigned to $2p_{3/2}$ and $2p_{1/2}$, respectively. These positions match well with thiolate (RS⁻) bound to the surfaces of AuNRs.



Figure S2. The morphology of AuNR@CTAB and AuNR⁺. Panel **a** presents the TEM tomographic reconstructed images of AuNR@CTAB from different directions and panel **b** contains corresponding images of AuNR⁺. We see no significant alteration between the two image panels.



Figure S3. TEM images of a) TMV in presence of 0.002 mM MUTAB which shows that MUTAB did not cause any arrangement in TMVs at the experimental condition, and b) TMV-AuNR⁺ in presence of low (0.5 μ g/mL) TMV concentration. The TMV-AuNR⁺ units coexist with well-dispersed excess AuNR⁺s.



Figure S4. Optical microscopic images showing the width and pitch of TMV-AuNR⁺ system at low to high TMV concentration- a) 6 μ g/mL, b) 12 μ g/mL and c) 15 μ g/mL.



Figure S5. Cryo-TEM images of TMV-AuNR⁺ resulting from reverse addition. **a-c** Gradually higher AuNR⁺ to TMV concentration ratio. **d** Large-area image showing the absence of long and thick wire-like structures. The area marked with blue circle shows that in a few places TMVs appear as aligned in a particular direction locally, but in almost everywhere else their arrangement is random as marked by yellow circles.



Figure S6. Experimental CD spectra at various TMV to AuNR⁺ concentration ratio **a** without smoothening, **b** after 100-point Savitzky-Golay smoothening. Initially, with the increase in TMV concentration (up to 12 μ g/mL), the CD signal gets stronger and from 12 μ g/mL to 15 μ g/mL, signal intensity decreases. **c** g-factor of TMV-AuNR⁺ system and **d** that of TMV-AuNP system at 200 mM ionic strength. Intensity of the negative peak is comparable for both the systems, whereas, the positive peak is 10 times more intense in case of TMV-AuNR⁺ system.



Figure S7. Dark-field optical images of TMV-AuNR⁺ with gradually higher TMV concentration: **a** 3 ug/mL, **b** 6 ug/mL, **c** 12 ug/mL.



Figure S8. Change in zeta potential of CNC-AuNR⁺ system with increasing CNC concentration. The initial value is of AuNR⁺ alone. The value decreases as CNC is added. At a point it crosses the zero-point, suggesting that the negative surface charge of CNC is exactly neutralized by positively charged AuNR⁺. Upon further CNC addition, zeta potential becomes more and more negative due to the conjugation of excess CNCs.



Figure S9. g-factor of CNC-AuNR⁺ at different CNC concentration. Flattening of the absorbance spectra at high CNC concentration suppresses the negative peak intensity beyond 0.06 wt% of CNC.