

## Electronic Supplementary Information

### Decorated Protein Nanowires with conductive properties

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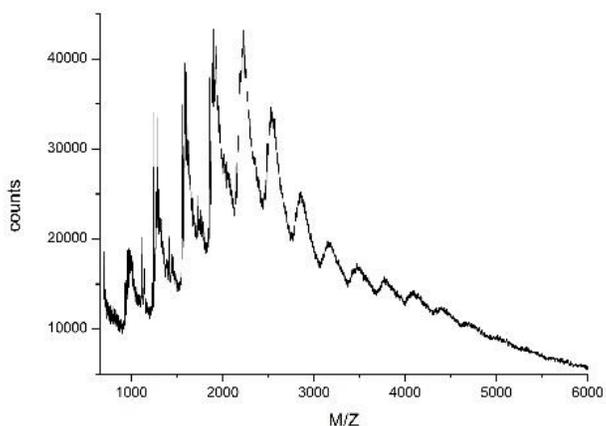


Figure S1 MALDI-TOF mass spectrum of PEDOT-S with dihydroxybenzene as a matrix. The monomer mass of EDOT-S is 255 g/mol. The peaks for 3 until 16 monomers in length can be seen.

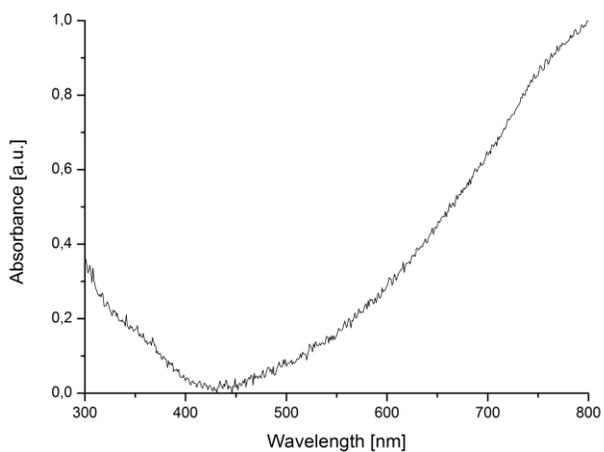


Figure S2 Optical absorption spectrum of PEDOT-S (0.050 mg/L, diluted in milliQ-water)

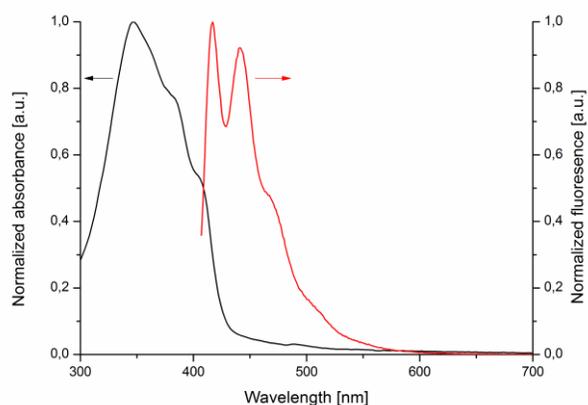


Figure S3 Optical Absorption/Emission spectrum of BMSBP internalized into insulin amyloid like fibrils.

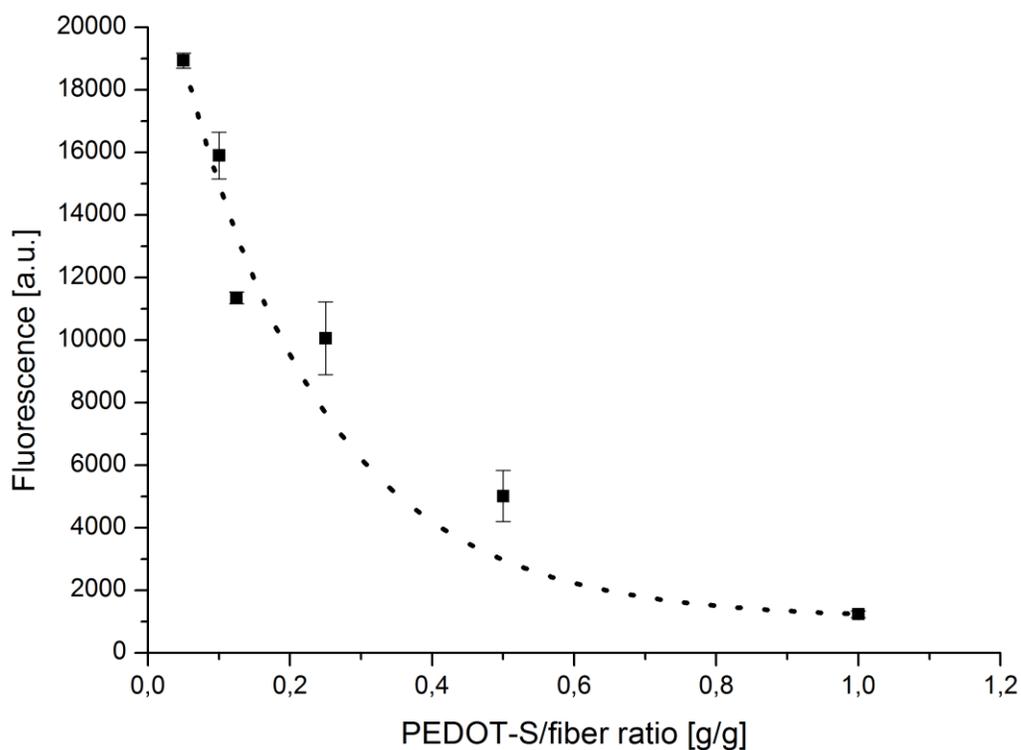


Figure S4. Fluorescence signal at 440 nm of BMSBP fibrils with addition of different amounts of PEDOT-S. Excitation wavelength at 405 nm. A dotted line depicting an exponential decline is added as a guide to the eye.

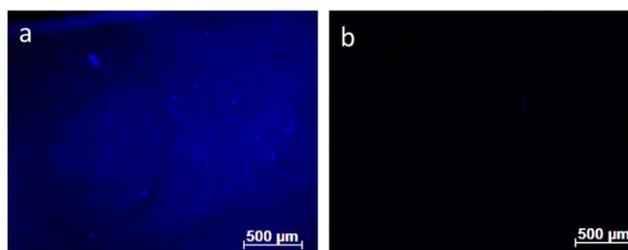


Figure S5. Fluorescence microscopy images ( $\lambda_{\text{exc}}$  365 nm, 1.8 ms) of uncovered (a) and PEDOT-S covered (b) fibrils embedding 4,4'-Bis (2-methoxystyryl)-biphenyl .

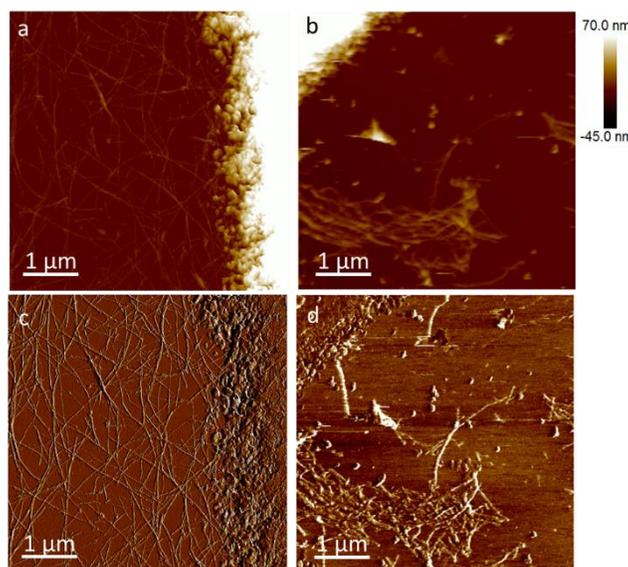


Figure S6. AFM topography images of uncovered (a) and PEDOT-S covered (b) fibrils deposited on glass substrates having lateral ITO electrodes. Images in c) and d) are the corresponding phase and friction images. The surfaces depicted in b) and d) were APTES treated prior to deposition.

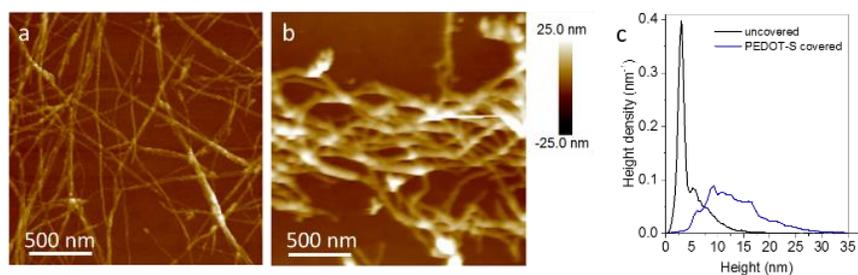


Figure S7 a) Uncovered fibrils; b) PEDOT-S covered fibrils; c) Compared heights distribution plots for the uncovered and PEDOT-S covered fibrils. The normalization of the densities  $\rho(p)$  (where  $p$  is the height) is such that  $\int_{-\infty}^{\infty} \rho(p) dp = 1$