GOLD NANOROD FUNCTIONALIZED WITH ELECTROACTIVE POLYMER AND THE BIONANOACTUATION IN LANGMUIR FILMS

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Functionalization of metal nanoparticles with electroactive polymers is considered an important approach to obtain new phenomena based devices mainly due to the nanoscope charge transport, charge trapping and consequently interaction with variable wavelength radiation. Aqueous dispersions of electroactive-stabilized gold nanorods (AuNRs-PEDOT:PSS) were prepared in a scalable fashion by surfactant exchange from cetyltrimethylammonium bromide (CTAB) – stabilized AuNRs, using polystyrenesulfonate (PSS) as a surfactant. Further AuNR’s were functionalized by the oxidative polymerization of 3,4-ethylenedioxythiophene. The surfactant exchange process and monomer oxidation were monitored by uv-vis absorption spectroscopy and Transmission Electron Microscopy (TEM). The obtained AuNR structure were detected by 800 nm plasmonic absorption, characteristic of nanorods structures. TEM images indicates that AuNR maintain their shape during all functionalization process. Thus, the proposed process was successful applied for functionalization of Au nanorods with conductive polymer PEDOT: PSS combining both optical and electrical properties at nanoscale, as observed by impedance spectroscopy. Another interest study in moment have been doing with cellular membrane model using Langmuir techniques. The preliminary results indicating some specifies molecular group interaction between the nanoparticle and phospholipid groups present in the water interface.

Keywords: Au nanorods, electroactive polymer, bionanoactuation

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