GOLD/POLYANILINE COLLOIDAL NANOCOMPOSITES AS FLUORIMETRIC PROBES FOR DNA DETECTION OF HUMAN PAPILOMA VIRUS

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Human Papiloma Virus is the generic name of a group of viruses that infect the skin. In the present work we show that composites of gold nanoparticles stabilized by conducting polymers prepared by use of solution chemistry methods can be used as convenient fluorimetric biosensors for DNA. While transmission electron microscopy reveal that the diameter of the particles is of the order of 2-4nm, impedance measurements show that the change on the pH level of the solution not only affects the degree of conductivity of the nanocomposites, but also determines the size of the colloidal particles and their aggregation characteristics. By controlling the degree of protonic doping of the conducting polymer, we have also shown that it is possible to adjust the intensity of the luminescence of the Au/PANi nanocomposites. This luminescence is affected by the interaction of the nanoparticles (which act as polycations) with the phosphate groups of DNA (polyanions), as confirmed by fluorescence microscopy. While the sensor operation is based on the electrostatic attraction of metal-polymer nanoparticles and the DNA targets, its specifity for DNA detection is based on the molecular hybridization between single-stranded DNA probes and their complementary single stranded DNA targets.