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Electronic and vibrational spectra of novel Lanreotide peptide capped gold nanoparticles

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ABSTRACT

Lanreotide, a somatostatin analogue peptide used for peptide receptor mediated therapy in metastatic neuroendocrine tumors, was used as capping agent of gold nanoparticles (GNPs) obtained by citrate reduction method. The displacement of the citrate groups from the GNPs surface by Lanreotide (LAN) molecules was evidenced by infrared and Raman spectra. The nanoparticles system, Au@LAN, was also characterized from HRTEM (High-Resolution Transmission Electron Microscopy) and Z-contrast images, UV-vis and EDS spectra. The stability on aging in water solution of the composite is discussed from the UV-vis spectra. The affinity constant of Au@LAN conjugate, calculated from Capillary Zone Electrophoresis data, was found to be 0.52. All the experimental evidence supports that the gold nanoparticles are effectively capped by the Lanreotide molecules through relatively strong covalent interactions. This result opens the possibility of combining the optical properties of gold nanoparticles and of Lanreotide molecule to form a bifunctional system for potential biomedical applications.