FUNCTIONALIZED PEG GOLD NANOPARTICLES (AuNPEGS) WITH EXCELLENT RESISTANCE TOWARDS AGGLOMERATION

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Abstract

The properties of Polyethyleneglycol (PEG) make it well suited for biomolecule linking and prevention of non specific adsorption. In the present study synthesis of specially functionalized gold nanoparticles coated with a monodisperse PEG polymer (AuNPEGs) are reported. The synthesis route taken, utilizes the water solubility of the PEG derivatives which enables a simple one step/one phase synthesis procedure.

During the synthesis the AuNPEGs, the surface charge, type of end functionalization and size of the gold particles can be controlled. Using PEG derivatives with carboxylic acid or biotin, anchors for affinity or covalent conjugation is provided, while -OH and $–CH_3$ terminated PEGs provides an inert background. The AuNPEGs proved to be very robust towards harsh treatment, being able to sustain high and low pH, highly concentrated salts for long periods of time (months) and boiling, freezing/thawing cycles. The AuNPEGs could also be manipulated by extraction from aqueous into organic phases, as well as drying and reconstitution without the addition of assisting surfactants. The particles were characterized by UV-Vis light spectroscopy, Dynamic Light Scattering, centrifugation and the functionality and density of the functional anchors was investigated by UV-Vis light spectroscopy and Quartz Crystal Microbalance measurements.